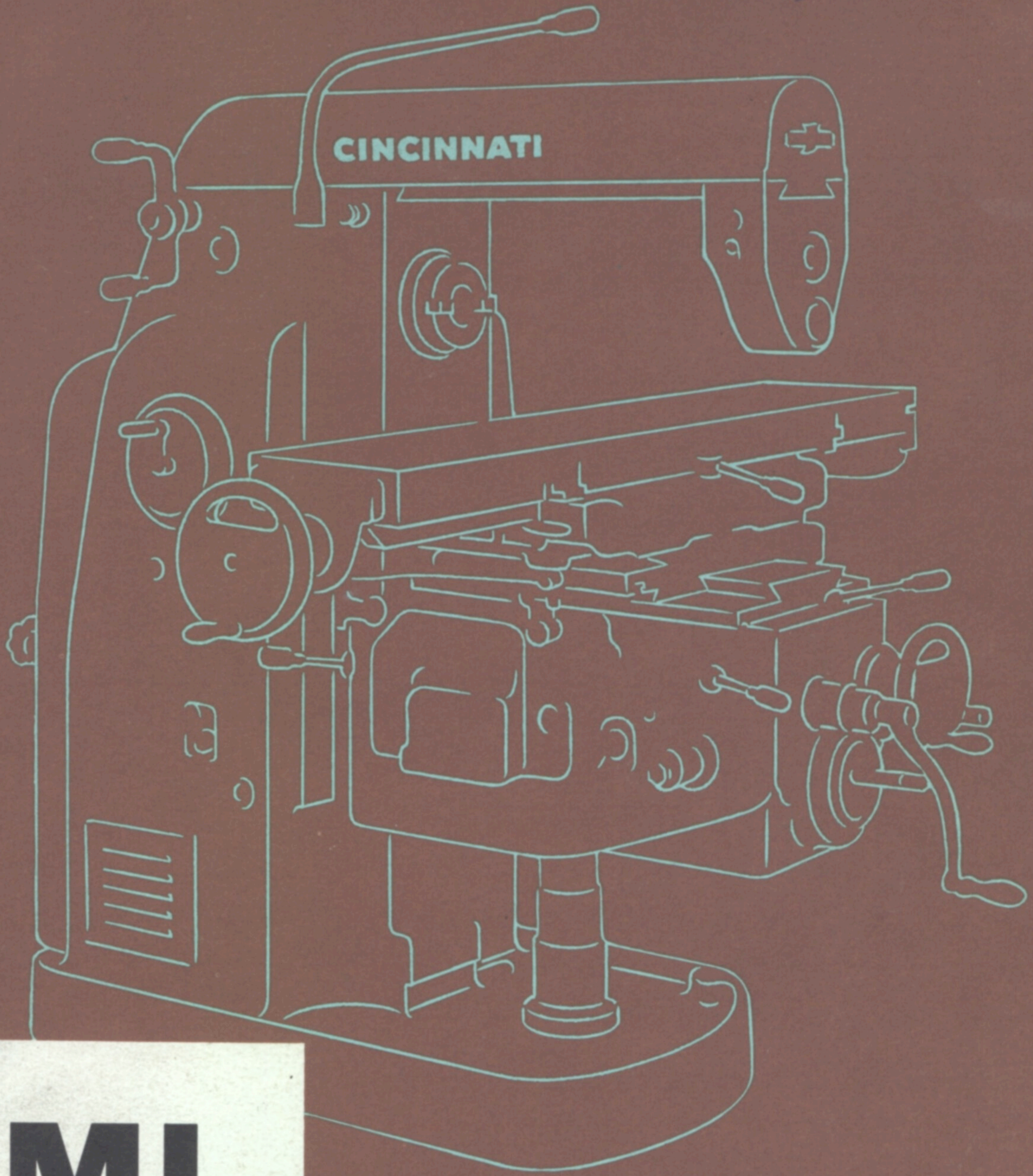
FOLDER 566

OUR-MACH 566

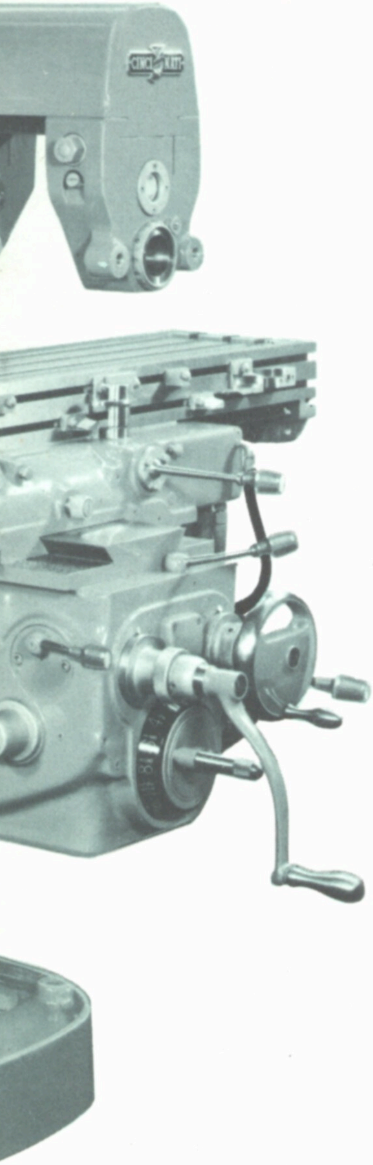


ML
and
MI

MILLING MACHINES

[redacted] $15,485.00
34" table
5 H.P. 8 H.P.
10 weeks.

#566
2J-2P-5H-11



CINCINNATI
ML
AND
MI
MILLING MACHINES

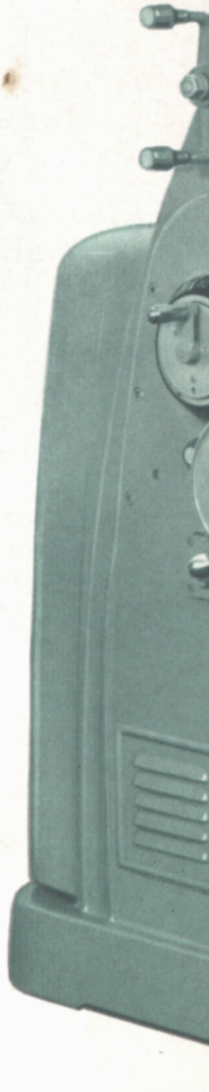
© 1957 The Cincinnati Milling Machine Co.

You get a lot more milling machine — with no more investment — when you get a Cincinnati.

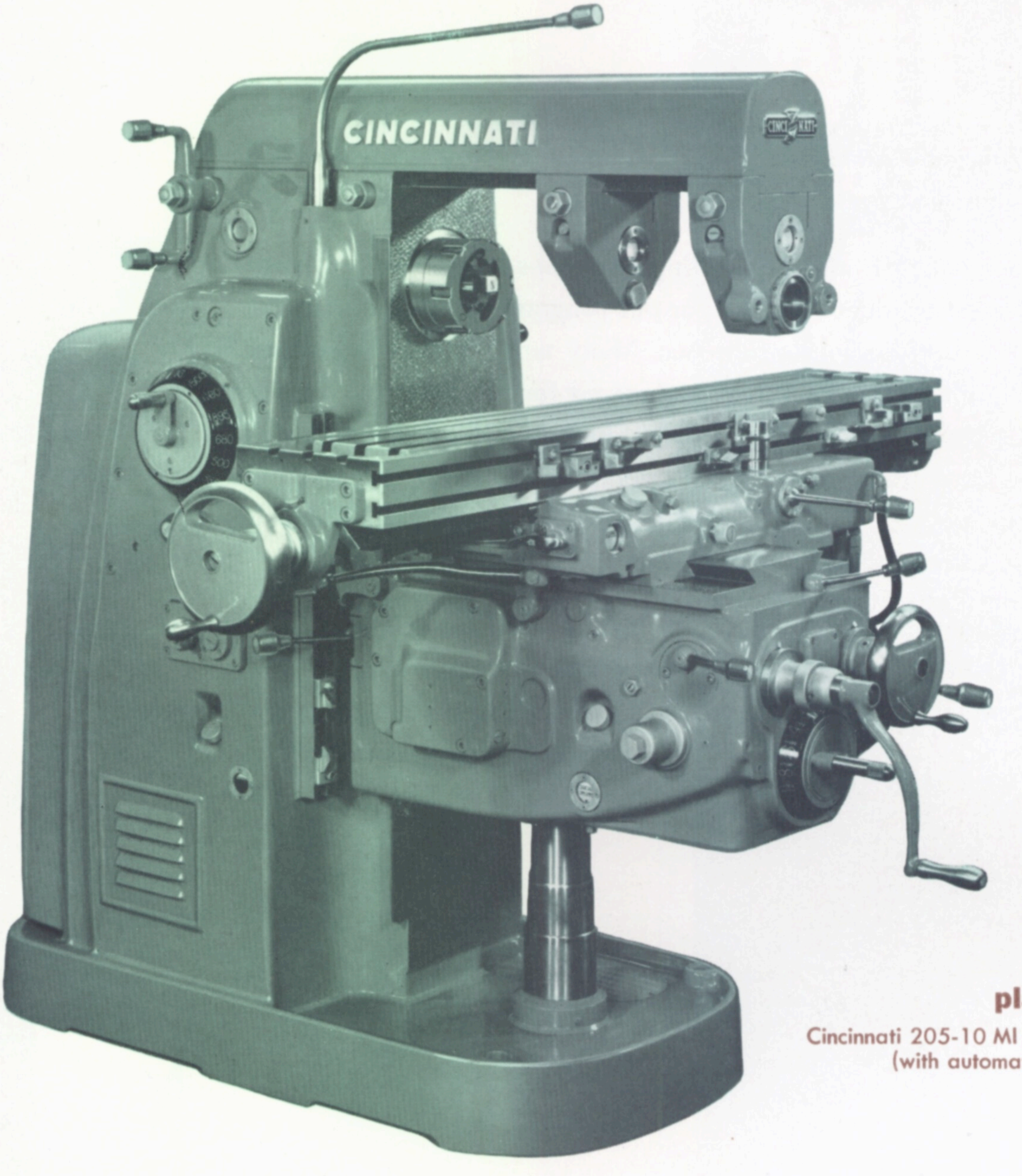
The Cincinnati ML and MI Milling Machines described in this catalog are the latest product of a 74-year-old program of milling machine research and in-the-field experience. Many new features have been built into these machines — features engineered for one purpose: to help you cut costs in your toolroom or production milling operations. They help you cut costs by making the operator's job easier and less tiring, by permitting a greater variety of jobs to be assigned to the machines, by cutting floor-to-floor milling time.

You'll see many of these Cincinnati features described inside. So, look through the catalog; then call in your Cincinnati representative. Prove to yourself: you can get a lot more milling machine when you get a Cincinnati — and you can get a Cincinnati with no more investment.

"If you need a new machine and don't buy it, you pay for it without getting it."

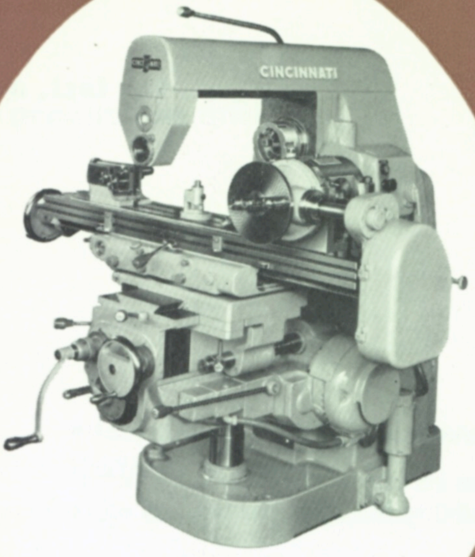


CINCINNATI ML AND MI MILLING MACHINES



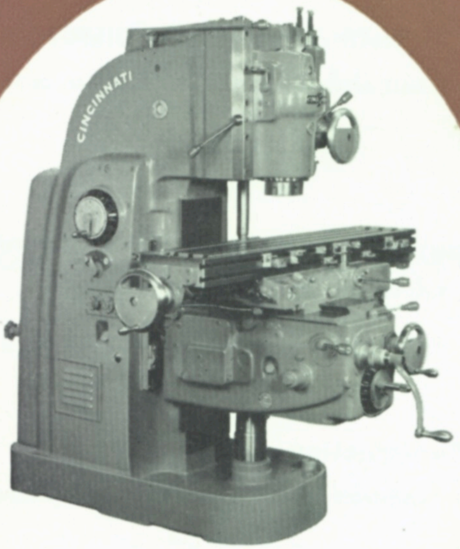
plain

Cincinnati 205-10 MI Plain Milling Machine (with automatic table cycles).



universal

Cincinnati 205-10 MI Universal Milling Machine



vertical

Cincinnati 205-10 MI Vertical Milling Machine (with automatic table cycles).

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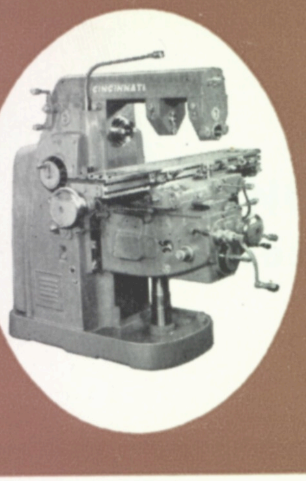


CINCINNATI OFFERS YO

. . . for fast, accurate, saf

all machines have:

Sixteen Spindle Speeds . . .

a wide range for milling all types of metals with modern cutters.

Single Crank Selection of Complete Range of Speeds . . .

it's quick and easy; a half-turn either way changes speeds to the next higher or lower increment.

Sixteen Feeds . . .

a wide range for toolroom and production milling.

Single Crank Selection of Complete Range of Feeds . . .

without moving a step; a simple one-half turn of the crank changes feeds to the next higher or lower increment.

Automatic Backlash Eliminator . . .

standard equipment on all machines; lets you climb or conventional mill.

Dynapoise Overarm . . .

an exclusive Cincinnati feature that smooths out the cutting action.

Rugged, Rigid Cast Construction . . .

for full power performance and accuracy.

Automatic and Oil Shot Lubrication . . .

reduces service and maintenance expense . . . outside accessibility for knee and column oil reservoir filters.

Independent and Directional Feed Control Levers . . .

provide built-in self-confidence for the new operator.

Quick Adjusting Micrometer Dials . . .

just pull out and reset; that's all there is to it.

Automatically Disengaged Hand Cranks . . .

added safety for operator and passers-by.

Unit Construction . . .

simplifies service and maintenance problems.

Full Power to Spindle Drive . . .

auxiliary motor for feed drive.

THESE ADVANTAGES . . .

oolroom or production milling

Adjustable Starting Lever . . .

may be positioned as desired by operator.

Live Rapid Traverse . . .

a time-saving convenience for the operator and set-up man.

Heavy Spindle with Center Bearing . . .

transmits maximum power required for heavy cuts – smoothly.

Completely Enclosed Knee Has Apron Extension . . .

for sustained accuracy under any load.

All Rotating Shafts and Gears Enclosed . . .

added protection for the operator.

Enclosed Main Drive Motor . . .

built-in electrical controls with safety interlock.

plain **machines;**

Completely Automatic Table Feed Cycles Available . . .

dog-controlled, easy to set; combines increased productive capacity with knee and column flexibility.

universal **machines;**

Dividing Head Included as Standard Equipment . . .

increases variety of work which may be assigned to the machine.

vertical **machines;**

Power Feed and Power Rapid Traverse to Head . . .

a time-saving production feature supplied as standard equipment.

Completely Automatic Table Feed Cycles Available.

Four-Position Turret Stop with Dial Indicator . . .

a time saver in boring and step milling operations requiring accurate depth.

Screw Feed to Head.

Quick-Acting Taper Gib Clamp for Head.

Individual Head Lubrication System . . .

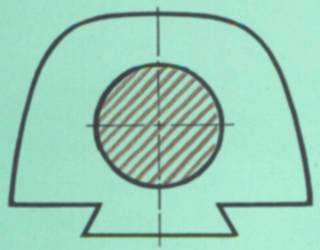
with scavenger pump.

Full Length Bearing in Vertical Ways . . .

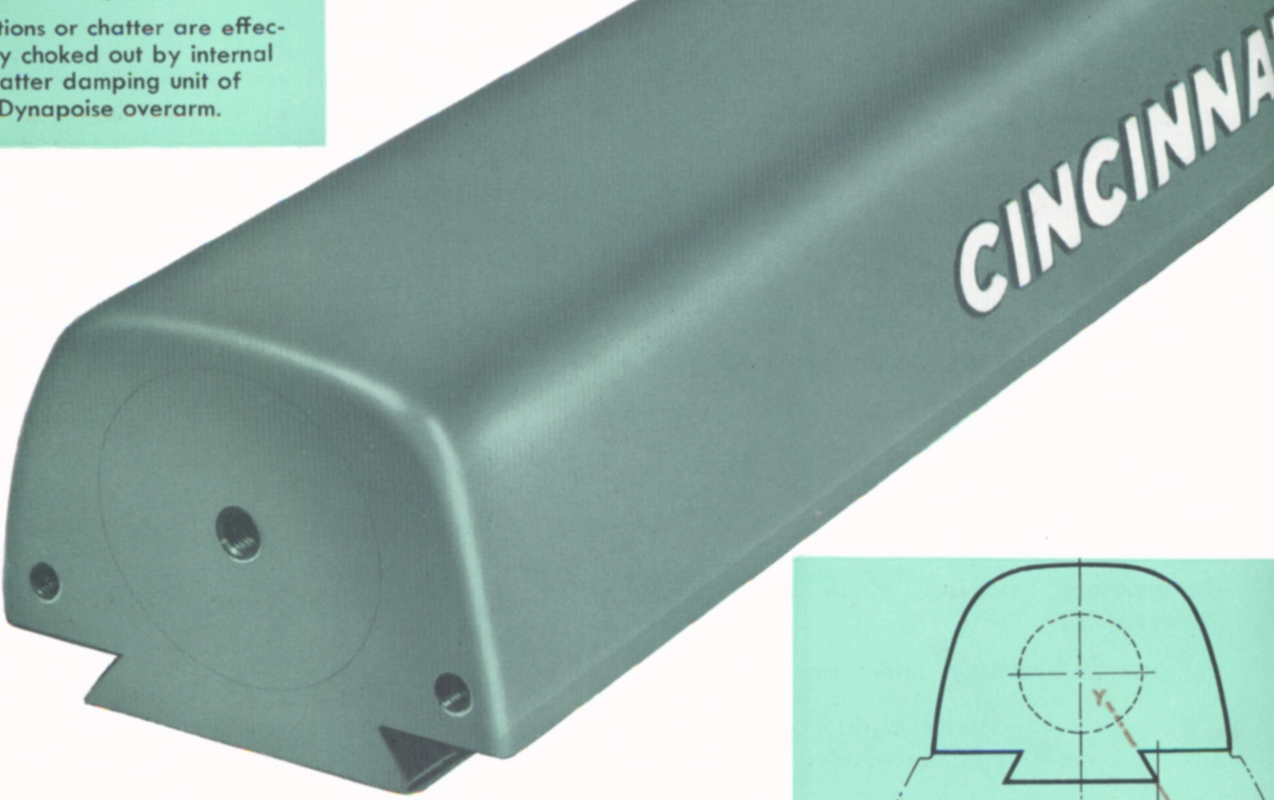
no matter what position head is in.

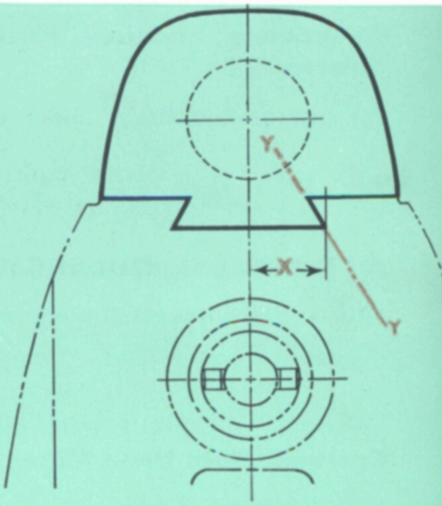
an exclusive feature –

DYNAPOIS

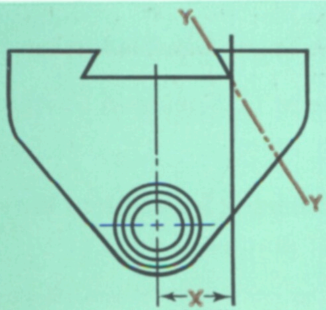


Vibrations or chatter are effectively choked out by internal chatter damping unit of Dynapoise overarm.



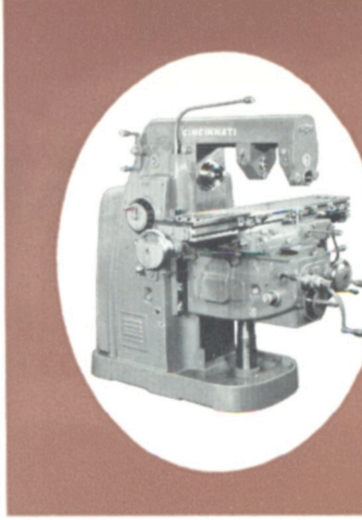


Overarm alignment held accurate–
overarm is positively clamped to su
face Y-Y; dimension X remains constar



Arbor supports and milling attachments also clamp against surface Y-Y to maintain accuracy of dimension X.

RECTANGULAR OVERARM



Dovetail construction for rigidity; Reduces chatter, aids accuracy.

When designed to provide a rigid support for the arbor and cutters, maintain accurate alignment, and damp out vibrations set up by cutting action, an overarm fulfills its role as one of the major elements in the over-all efficiency of a knee-and-column milling machine.

Cincinnati's familiar Dynapoise rectangular overarm meets these design requirements – without sacrificing one for either of the other.

Rigidity –

The Dynapoise rectangular overarm provides a single massive body on which to mount arbor supports and attachments. Dovetail construction resists forces tending to twist or deflect the overarm.

Accuracy –

Accuracy of alignment is maintained between the spindle, arbor supports, and attachments in this way: the overarm, when clamped, is always positively located against a solid bearing surface in plane Y-Y (see drawings on opposite page); arbor supports and attachments are also positively located in this same plane. Dimension X in both drawings remains constant; therefore, the original accuracy which has been built into the machine is maintained for each set-up – regardless of the length of the arbor, the number of arbor supports used, or the type of attachment used.

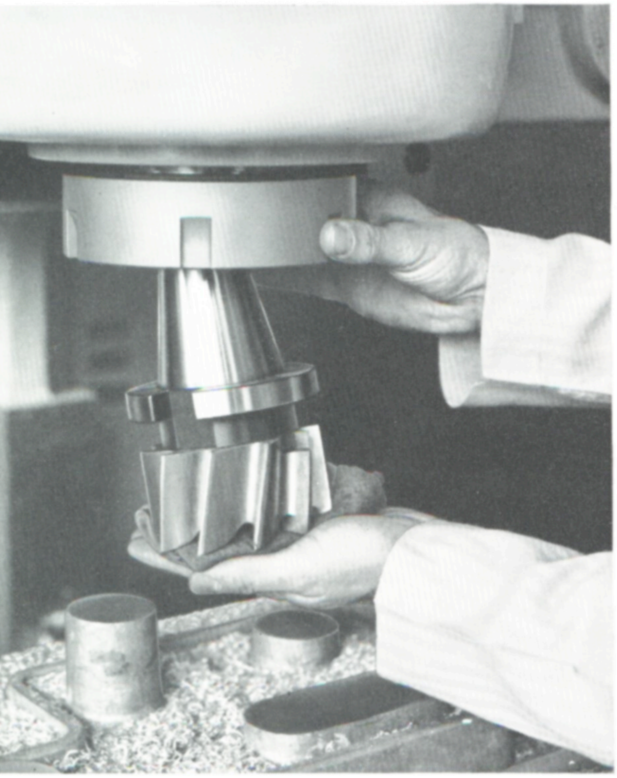
Effective Damping –

On a knee-and-column milling machine, vibrations set up by cutter action are often increased by excessive clearance angles on cutters, too small a chip per tooth, incorrect mounting of cutters, and improper clamping or support of the work piece. How can these vibrations be controlled? The design of the Dynapoise overarm has proven to be an effective solution to this troublesome problem. A heavy weight is suspended within the forepart of the overarm; the weight, because of its suspension system, acts in opposition to and out of phase with vibrations produced in the overarm by the cutting action. Any vibrations set up are immediately choked by frictional resistance between the relative motions of the overarm and weight.

This rectangular overarm is easy to position during set-up: just turn the overarm pilot wheel until the desired position is reached; lock it with overarm clamp. And arbor supports slip on and off the overarm dovetail easily for rapid job change.

AR-BOR-LOC® SPINDLE NOSE

A fraction of a turn is all you need,
For changing of tools with the utmost speed.

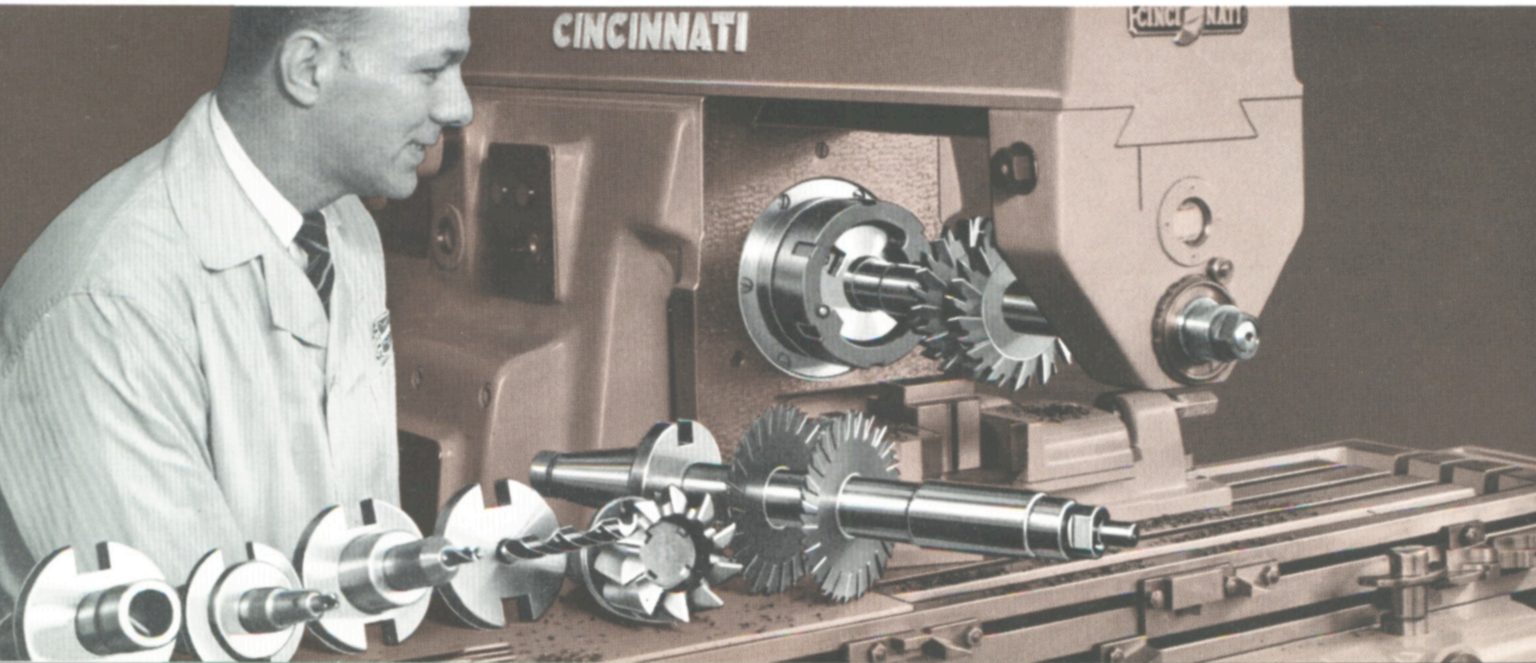


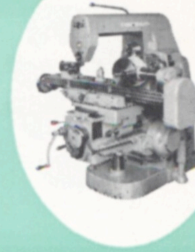
Like the design of all Cincinnati Knee and Column Milling Machines the ML and MI spindles are equipped with the Ar-Bor-Loc arrangement . . . another Cincinnati plus value with no additional investment. Operators can quickly change collets, adapters and even the long arbors in seconds, to perform a variety of operations. Ar-Bor-Loc spindle nose arrangement does not interfere with normal production setups which utilize extra heavy arbors and cutters requiring draw bolts.

And most operators will agree that the changing of cutting tools is an effortless operation with the Ar-Bor-Loc spindle nose arrangement. A fraction of a turn is all that's necessary to securely clamp arbors and adapters in the machine spindle nose. A positive stop screw, incorporated within the adapter ring, accurately positions the ring when removing arbors and adapters.

The Cincinnati Ar-Bor-Loc spindle nose arrangement is standard equipment on all ML and MI Milling Machines.

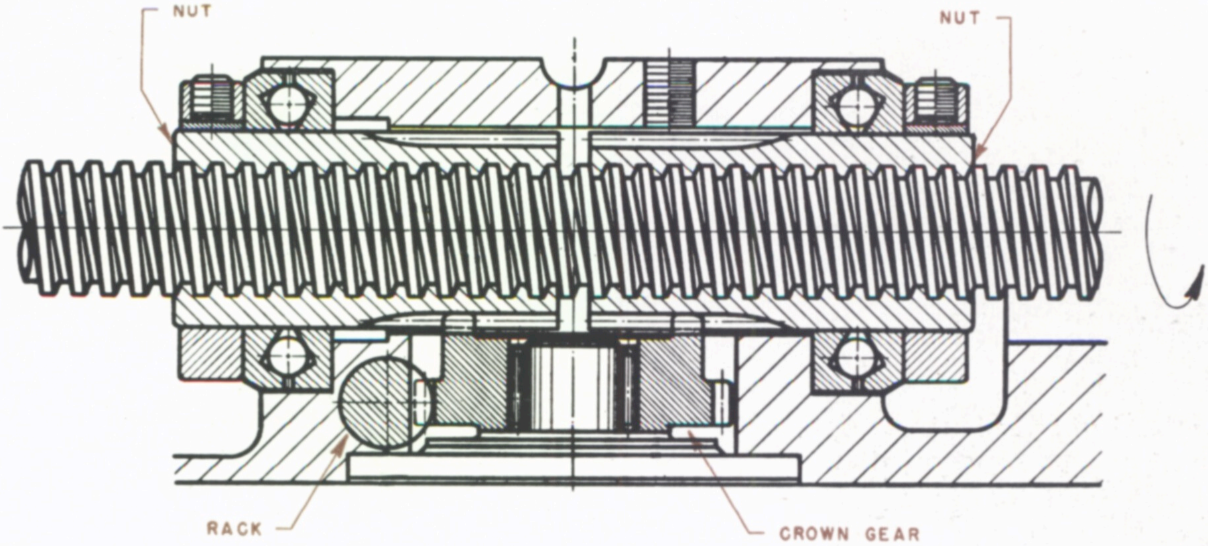
A wide variety of standard long arbors and adapters may be used interchangeably with the AR-BOR-LOC spindle nose arrangement.





AUTOMATIC BACKLASH ELIMINATOR

This Cincinnati feature lets you, at will, Conventional (up) or climb (down) mill.



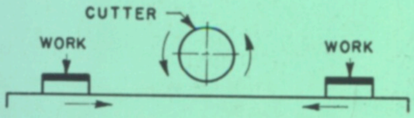
You can climb (down) mill as well as conventional (up) mill on any Cincinnati ML or MI Milling Machine: they're all equipped with Cincinnati's exclusive Automatic Backlash Eliminator.

And once engaged, the Backlash Eliminator is automatically activated while down milling, free during rapid traverse and manual table adjustments.

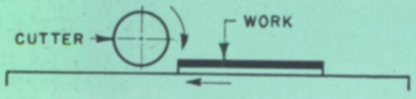
Here's how the Automatic Backlash Eliminator works:

Two independent nuts are mounted on the lead screw. These nuts engage a common crown gear which in turn meshes with a rack. Axial movement of the rack is controlled by the Backlash Eliminator engaging knob located on the front of the saddle. By turning the knob "in", the nuts are forced to move along the lead screw in opposite directions, thus removing all backlash. The figure above shows the nuts-gear-rack arrangement.

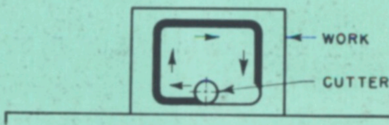
The Cincinnati Automatic Backlash Eliminator is standard equipment on all ML and MI Milling Machines.



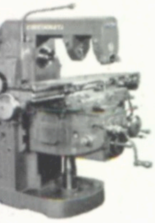
RECIPROCATING MILLING



THIN PARTS



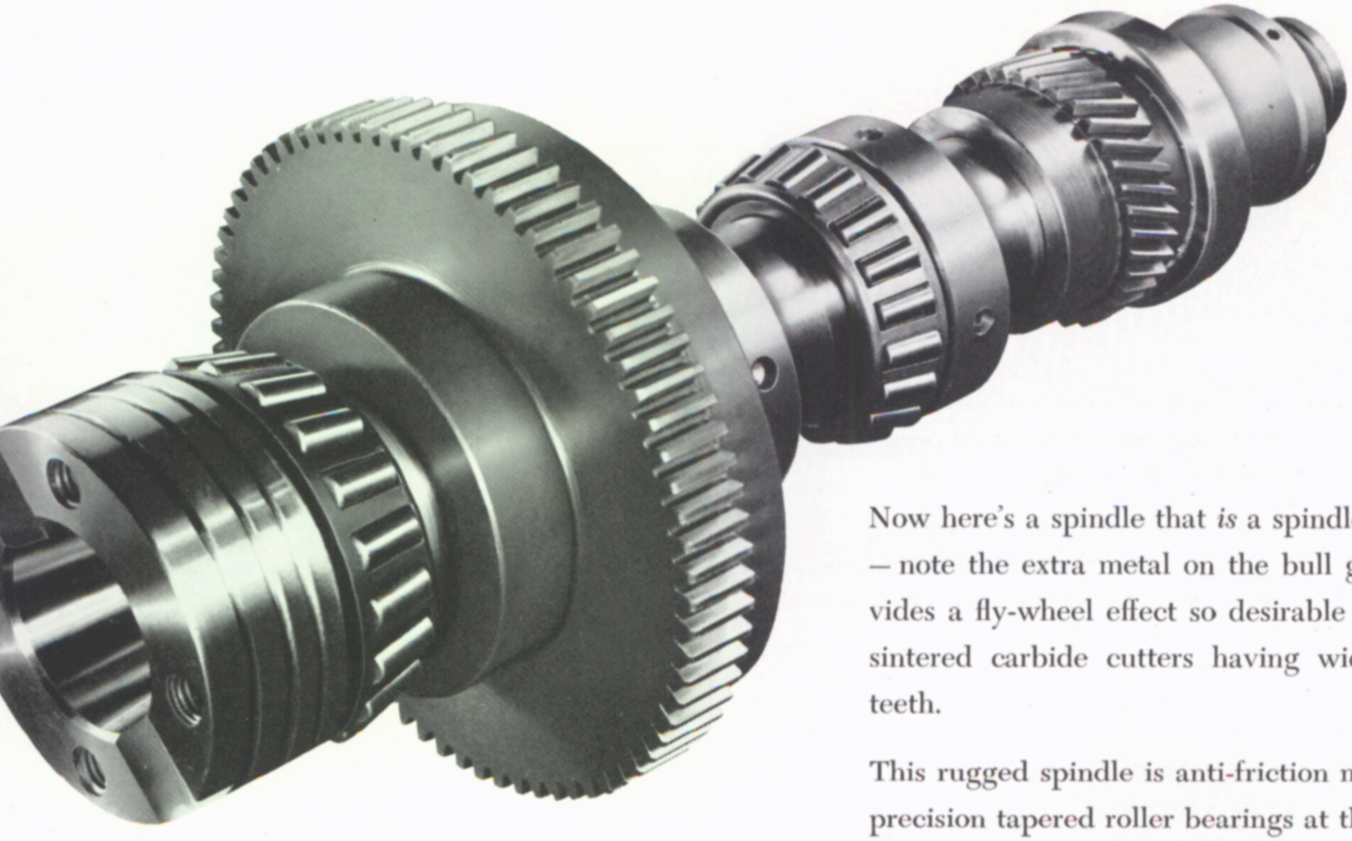
BOX MILLING



CINCINNATI ML AND MI MILLING MACHINES

SPINDLE

A rugged spindle with plenty of "guts". The bull gear is there for maximum cuts.



Now here's a spindle that *is* a spindle. It's heavy — note the extra metal on the bull gear: it provides a fly-wheel effect so desirable when using sintered carbide cutters having widely spaced teeth.

This rugged spindle is anti-friction mounted . . . precision tapered roller bearings at the front and center, precision roller bearing at the rear.

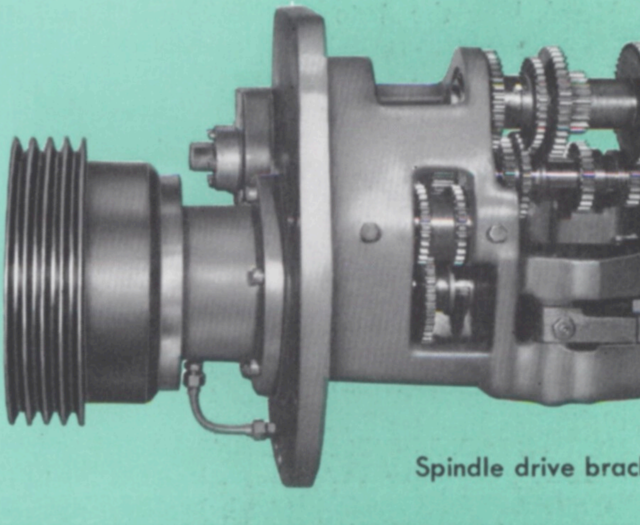
NIT CONSTRUCTION

Service man likes "unit construction": He services units without obstruction.

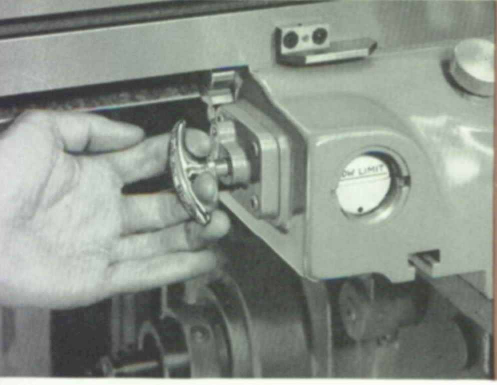
nit construction offers a potential value, for a machine so conucted can save many service and maintenance dollars.

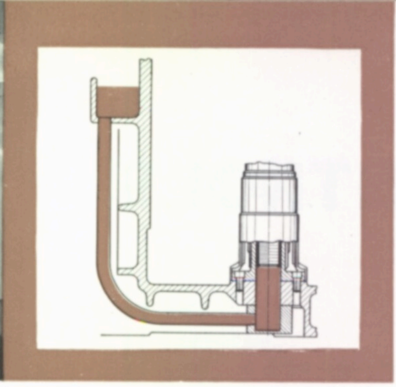
"unit construction" we mean the main operating components the machine are grouped and assembled as separate, compact its; each unit may be quickly removed *as a unit* for easy rvicing. For instance, the spindle drive mechanism (it's shown the photograph at the right): this unit may be removed from e machine by removing the drive V-belts and six screws at the ar of the column. The service man then has the unit "out in e open" where he can easily make adjustments or repairs. The me is true of the speed gear shifter bracket and the feed box; erely remove the holding screws and the entire unit lifts right t — a saving of much effort, grief, and time to the service man, d service costs for you.

Gear shifter b



Spindle drive brac





LUBRICATION

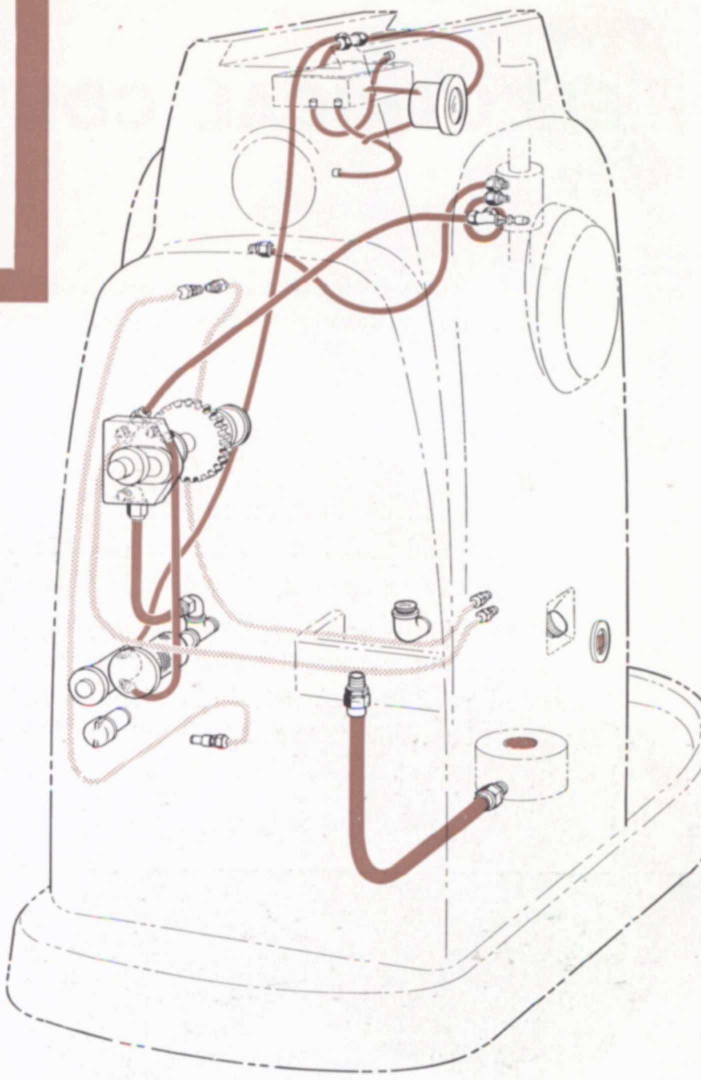
With automatic lubrication, production increases: Operator has more time for producing workpieces.

Another time-saving feature of these new ML's and MI's: lubrication is principally automatic. This feature minimizes time-consuming oiling routines, frees the operator for actual production work.

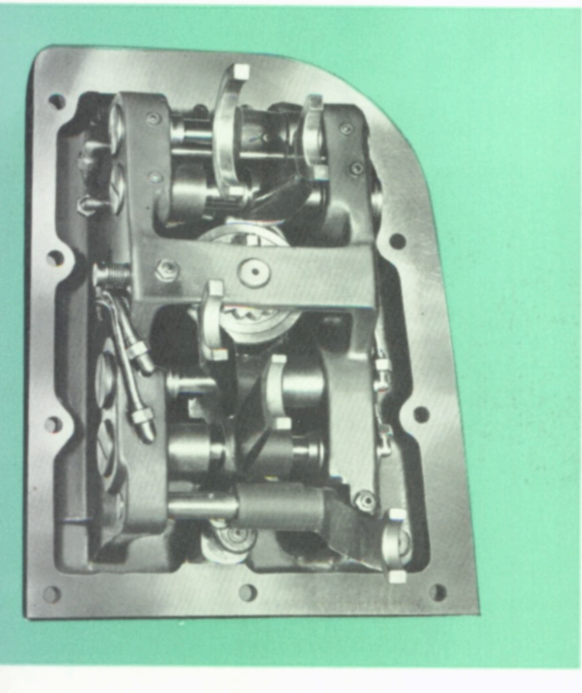
When the main drive motor is running, the lubrication pump is running, and units within the column are automatically lubricated.

The vertical feed screw has its own lubricating system. An oil reservoir, located in the column, feeds oil to the bottom of the "pedestal" in which the screw operates. In effect, the screw always runs in a bath of oil: as the knee traverses up, oil is admitted from the reservoir to fill the space left by the rising screw; as the knee traverses down, oil is forced back to the reservoir.

An oil-shot system keeps the saddle, housing, and table units properly lubricated.

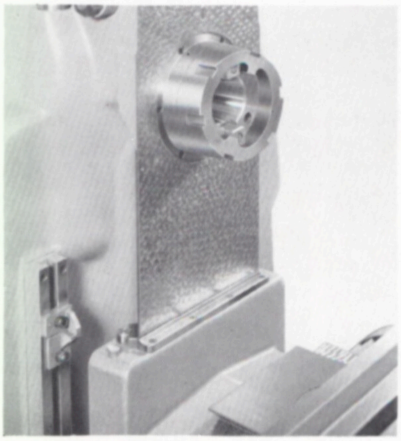


Lubricating system inside column. Light lines are included in system when automatic spindle stop is supplied.



APRON EXTENSION

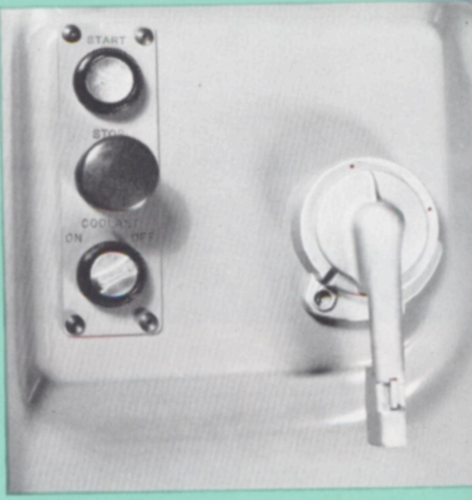
Apron extension on knee
Decreases deflection, you see.



To decrease deflection of the knee during heavy cutting pressures, the knee is designed with an apron extension. This construction increases the length of bearing between the knee and column. To keep the face of the column clean, a wiper is built into the apron extension.

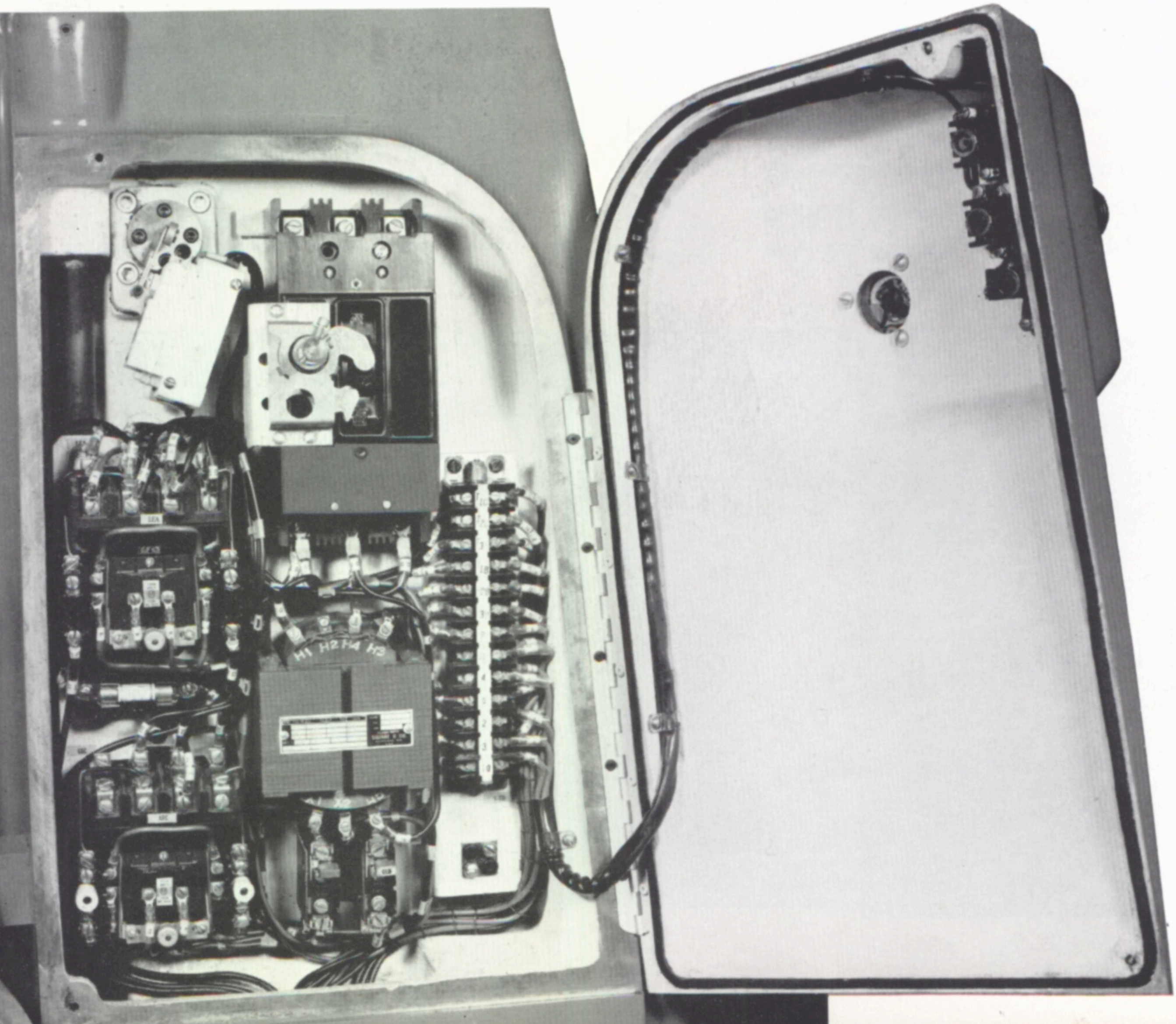
ELECTRICAL CONTROLS

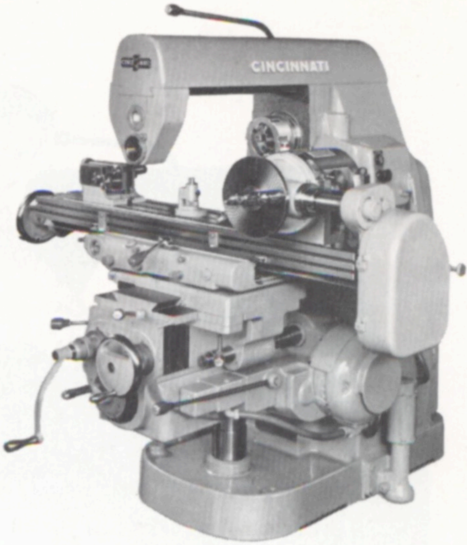
Built-in push buttons and controls are a "must"
For protection from damage, moisture, and dust.



To protect them from dust, moisture, and damage, electrical controls and push-buttons are built-in. The controls are conveniently grouped at the right side of the column where they may be easily reached. An important safety feature for the operator is the control transformer which is included in all A.C. electrical circuits: it permits only 110 volts to be available at the push button station.

Above: master start button, master stop but
coolant switch, electrical control switch—conv
iently grouped. • **Below:** Electrical panel
easily accessible . . . built into right side
column at convenient height for quick servic



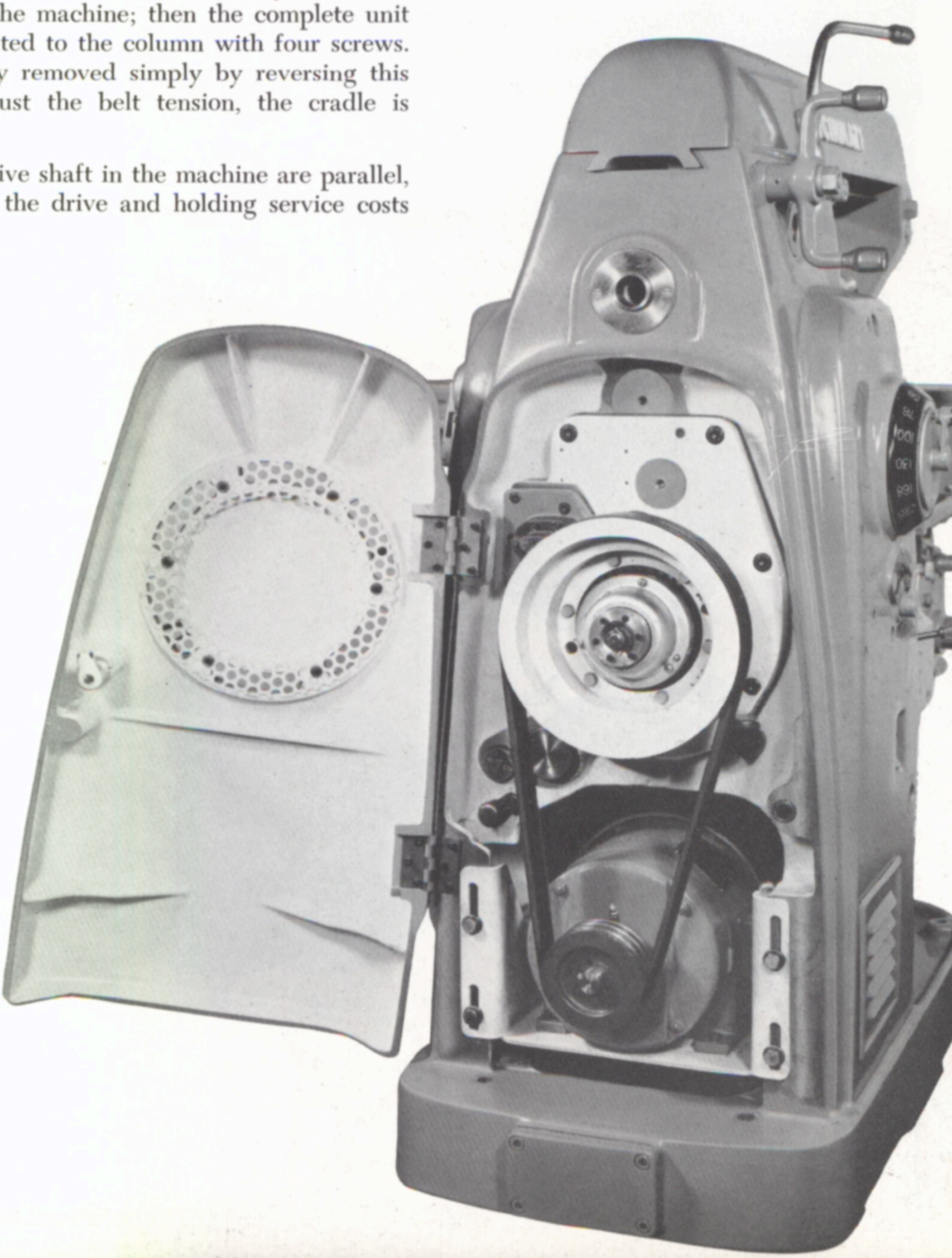


MAIN DRIVE MOTOR

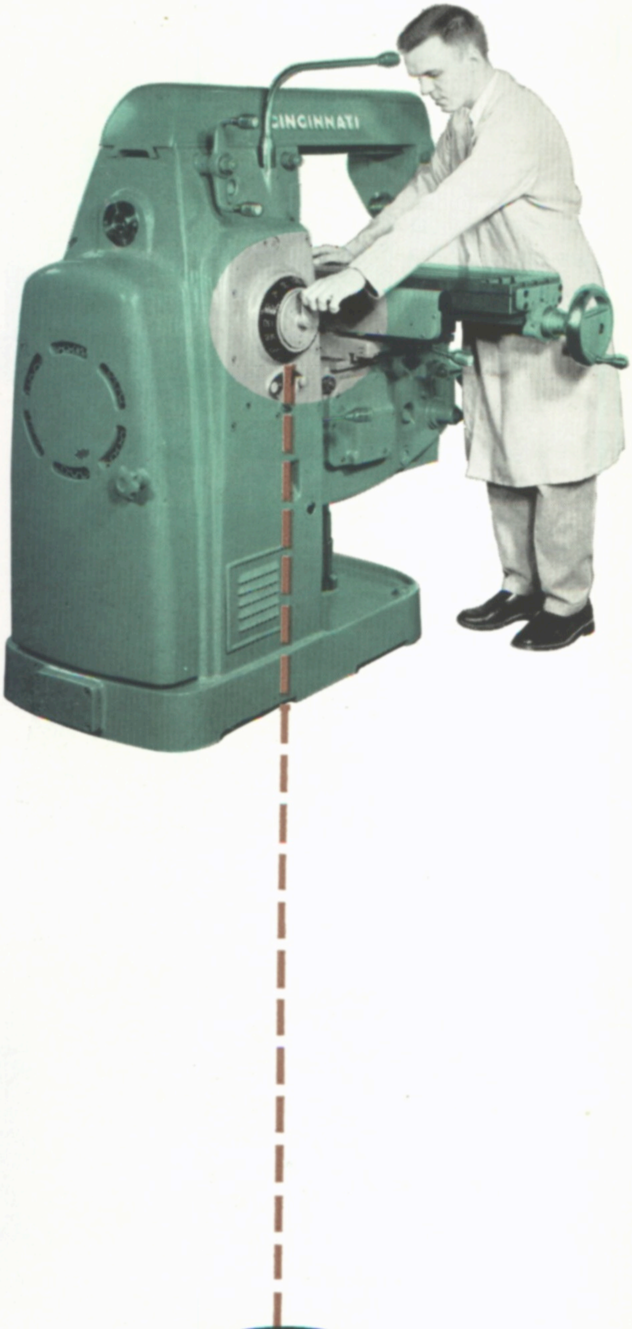
Motor is cradle-mounted;
And it's completely enclosed.
This means service is easy,
Moving belts never exposed.

Like other Cincinnati knee-and-column milling machines, the ML and MI spindle drive motor is enclosed in the column. Covering the motor, drive belts, and safety clutch is a large hinged door, making possible quick accessibility for service or adjustment. Also, when this door is opened, the main drive motor automatically stops, preventing possible operator or service-man injury. The motor is "cradle-mounted": at assembly, it is first bolted to a cradle outside the machine; then the complete unit is swung into place and bolted to the column with four screws. (The motor may be readily removed simply by reversing this assembly process.) To adjust the belt tension, the cradle is merely raised or lowered.

The motor shaft and first drive shaft in the machine are parallel, thereby greatly simplifying the drive and holding service costs to a minimum.



Open the door at the rear of the machine to adjust belt tension, adjust safety clutch, and service spindle drive unit or motor.



SPINDLE SPEEDS

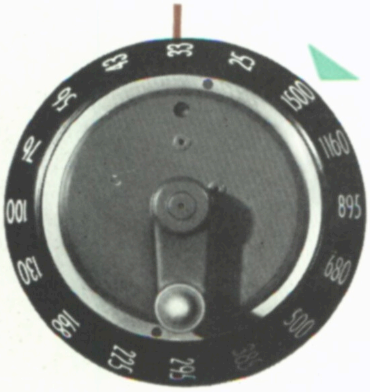
With a single control you can change To any speed within the range.

A single crank-type control selects the complete range of spindle speeds. The only manual effort required is that of rotating a selector valve; hydraulic power does the actual work of shifting gears. One-half revolution of the crank, either way, selects the next higher or lower spindle speed. From A to B in the illustrations at the right the lever was rotated one-half revolution clockwise; from A to C, it was rotated one-half revolution counter-clockwise. While the spindle is running, the speed change crank is automatically locked.

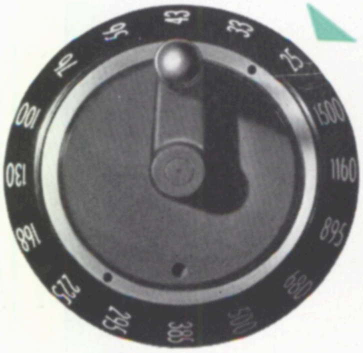
The ML and MI spindle speed ratio of 60 to 1 offers top efficiency in milling operations on parts made of various grades of steel, cast iron, aluminum, bronze . . . using cutters ranging from face mills to small mills. You have a choice of three ranges of speeds, all in approximate geometrical progression:

Standard Range (Supplied unless otherwise specified)	25 to 1500 rpm
Optional Low Range	20 to 1200 rpm
Optional High Range	33 to 2000 rpm*

* 33 - 2000 rpm is standard range on 410-14 MI's. 25 - 1500 and 20 - 1200 rpm ranges are not available on 410-14 MI's.



A



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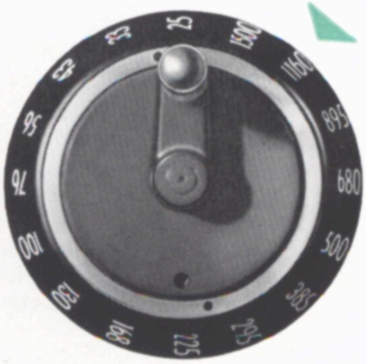


C

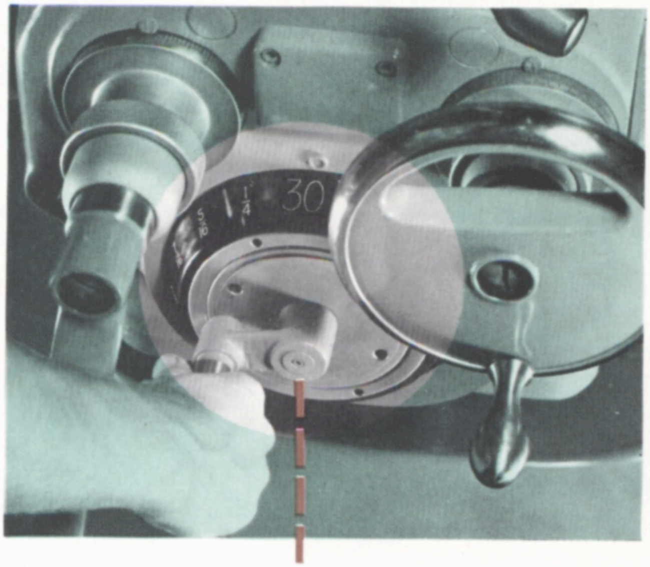
FEEDS

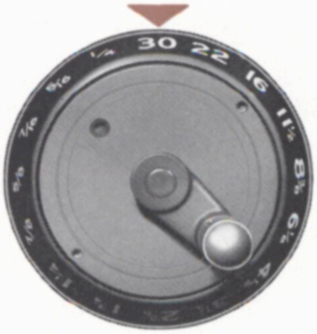
Sixteen feeds
Fit your needs.

The advantage offered by a high feed ratio is very important in general purpose milling machines, for the correct feed per tooth is then available for milling a wide range of materials from hard steel to aluminum; also various types of cutters can be used, including the complete range of end mills, form cutters, saws, plain and helical cutters, and fly cutters. Cincinnati ML and MI Millers have an exceptionally high feed ratio: 120 to 1!

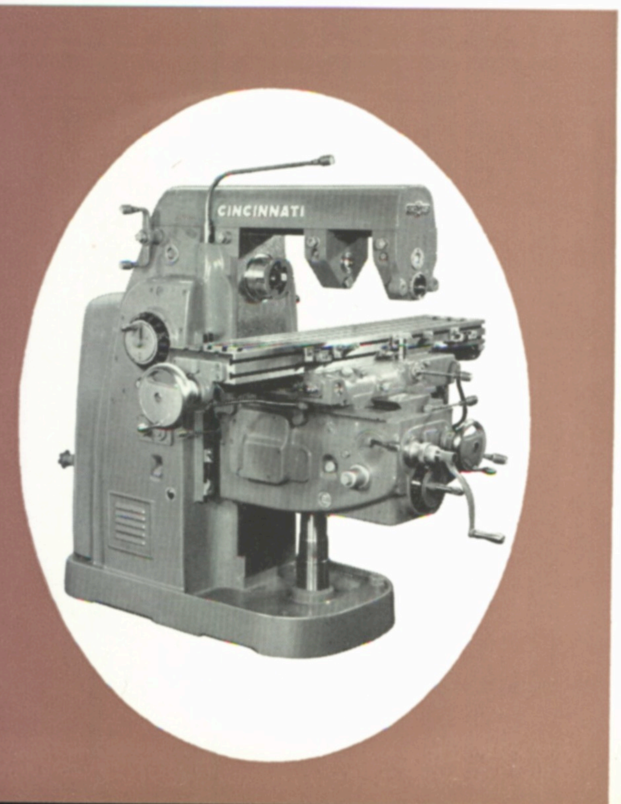
Standard Range (Supplied unless otherwise specified)	¼″ to 30″ per min.
Optional High Range	½″ to 60″ per min.

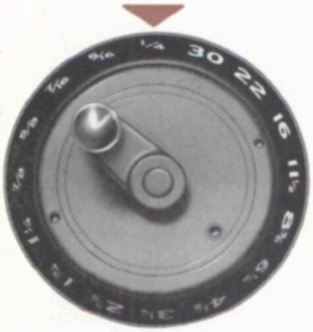
A single crank-type control, at the operator's normal working position, selects any feed within the complete range. One-half revolution, in either direction, rotates the dial in the same direction to the next feed rate setting, and meshes the proper gears for that feed. Assuming a feed rate setting of 30″ per min., indicated by D at the right, one-half clockwise revolution of the crank changes the feed rate to ¼″ per min. (E); one-half counter-clockwise revolution changes the feed rate to 22″ per min. (F).





D





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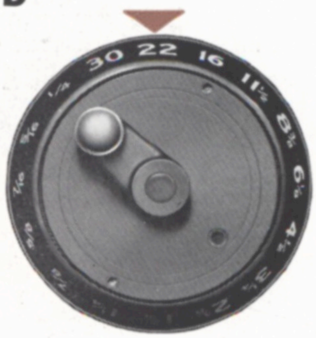
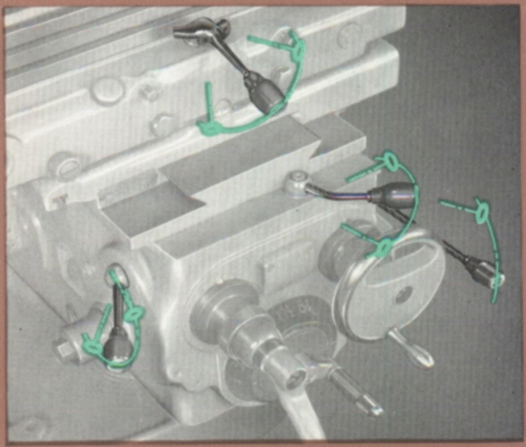


F

FEED CONTROLS



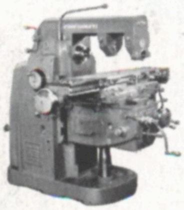
The direction of spindle rotation
Has no effect on the feeds;
And "directional" feature of levers
Gives new operator confidence he needs.

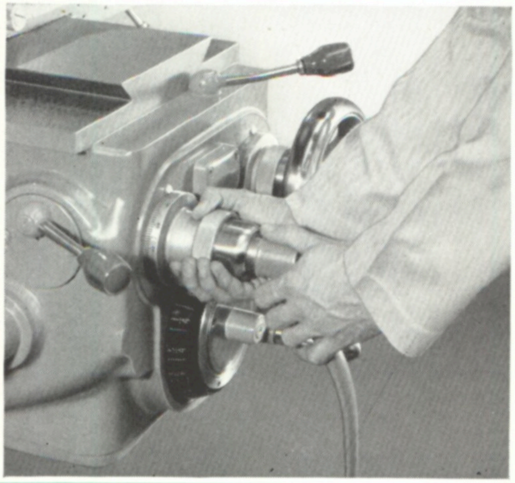
Each feed engaging lever on Cincinnati ML and MI Milling Machines is independent of the others and is not effected by the direction of rotation of the spindle. Each has its own forward, neutral, and reverse position.

An additional operating convenience, is the "directional" feature of the controls: when the table feed lever, for instance, is moved to the left, the table *feeds* left; when the lever is moved to the right, the table *feeds* right — built-in self-confidence for the new operator.

When either the longitudinal, cross, or vertical power feed is engaged, a positive mechanical linkage automatically disengages the hand control; there's no chance for the longitudinal or cross hand wheel or the vertical hand crank to spin when using power feed or rapid traverse.

Both hand and power controls are logically grouped for convenience and easy operation. In addition, the 307-14 and 410-14 MI's (plain and universal) have included as standard equipment a *complete set* of rear controls. (See page 23.) The 203-10 ML's and 205-10 MI's have a rear power feed control for longitudinal movement included as standard equipment; rear hand adjustments and rear power feed controls for cross and vertical movement are available as extra cost items.





MICROMETER DIALS

Pull out; then turn till clutch teeth have met;
Then release and the dial is accurately set.

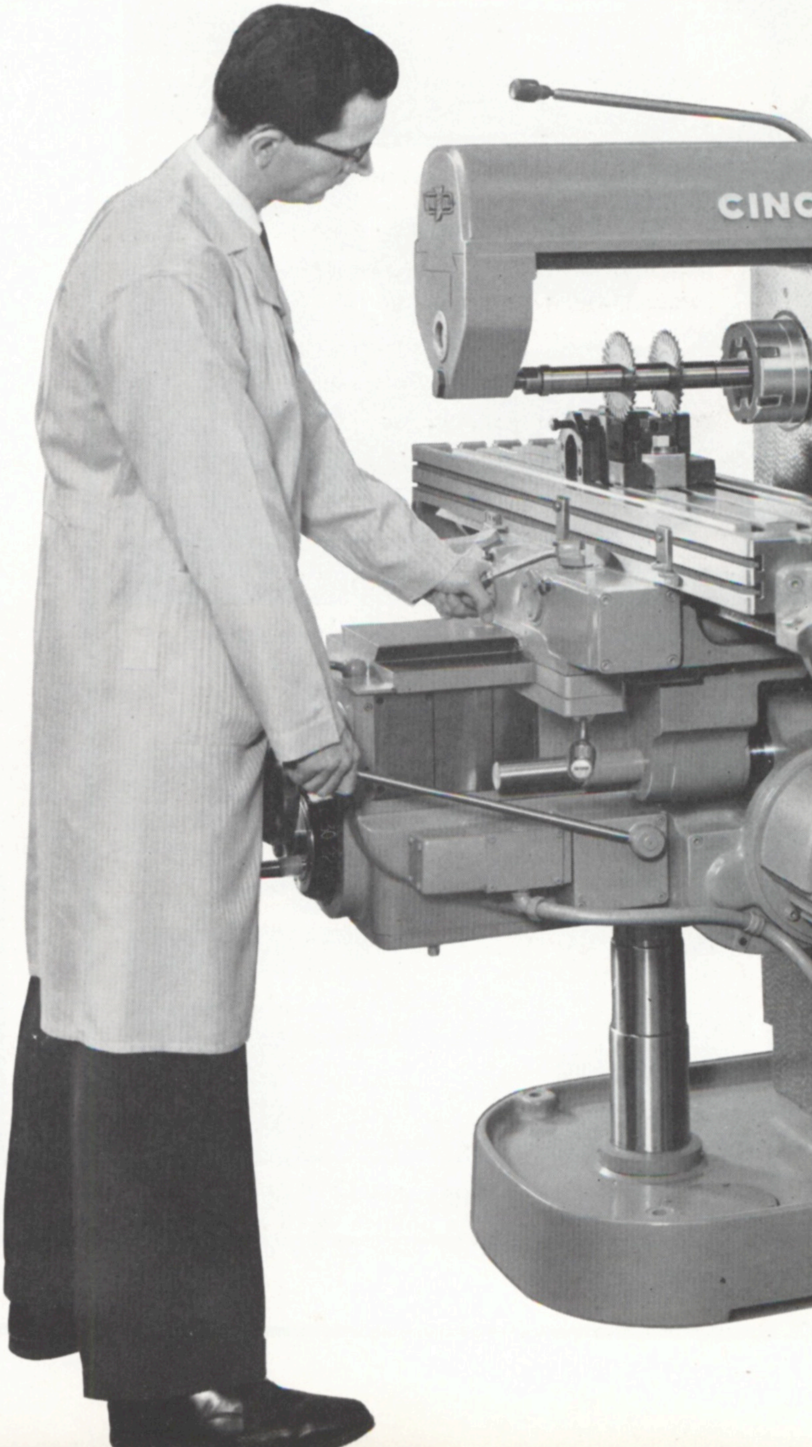
The large micrometer dials for manual feed adjustments are easily reset: merely pull the dial out against a light spring pressure, make the desired setting; the light spring pressure then slides the dial into contact with the clutch teeth and holds the dial in place. No thumbscrews to loosen; no "play" or looseness in the clutch teeth.

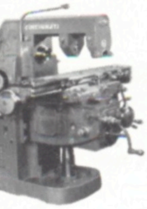
LIVE RAPID TRAVERSE

Rapid ahead
Though spindle is dead.

Even with the spindle stopped, the operator has rapid traverse available for all feed directions (150″ per minute for longitudinal and cross movements, 75″ per minute for vertical movements.) This live rapid traverse feature is a convenience for the set-up man: it enables him to make the major traverse movements with a minimum of effort and time.

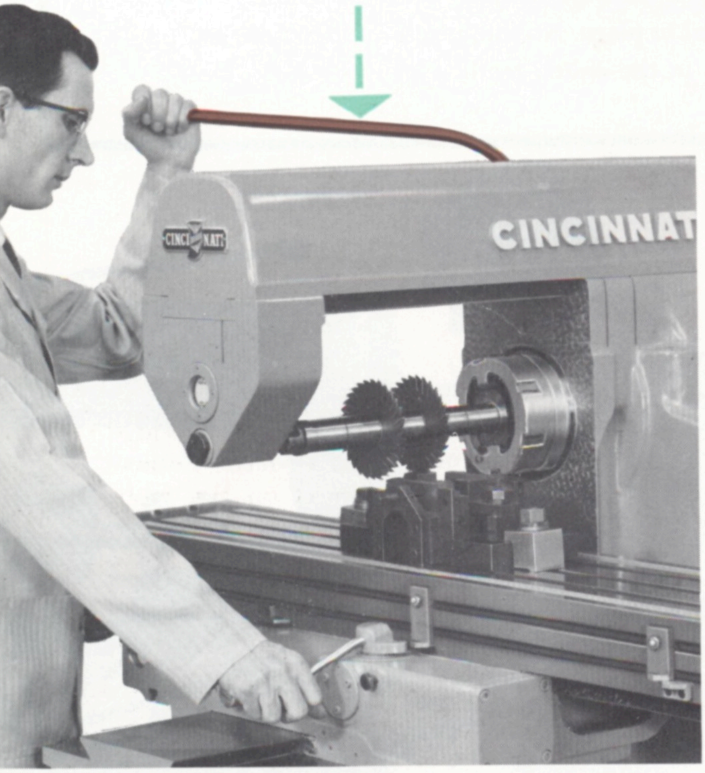
And the operator has a safer job: he can *stop* the spindle and safely brush the chips from the work and fixture during the rapid-return stroke of the table.





STARTING LEVER

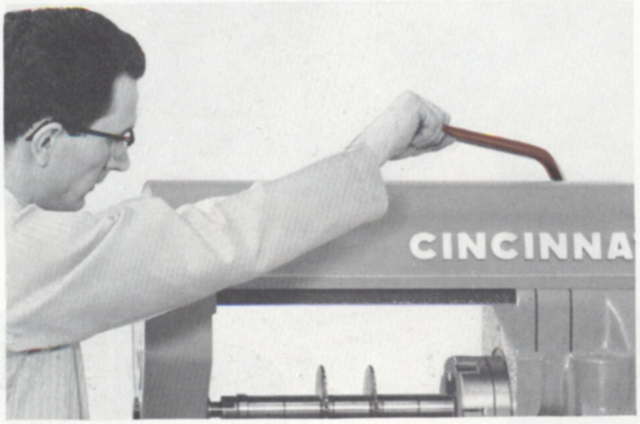
Adjustable lever lets operator choose The operating position he wants to use.



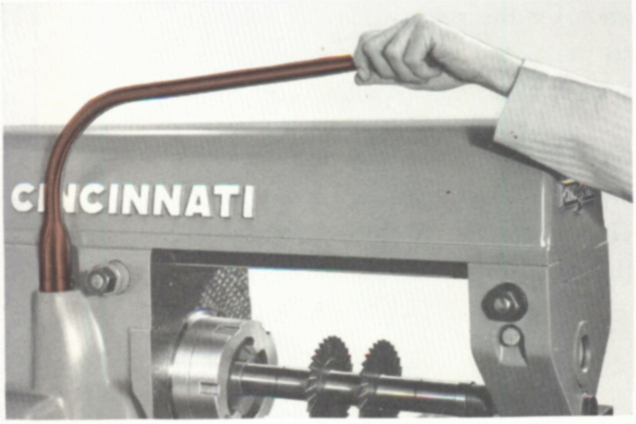
With this setup, the operator can adjust the starting lever to allow him to stand at the left or . . .

Here's another time-saving feature of these new ML's and MI's: the start-stop lever is adjustable through 360°. Therefore, the operator always has the lever within easy reach – no matter what type of setup he's using.

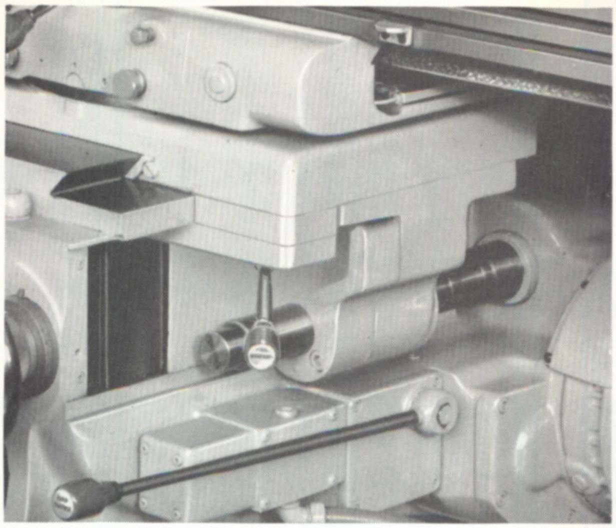
Clutch teeth are milled in the end of the lever; these teeth engage a similar set of teeth on a collar which is pinned to a vertical shaft extending from the column. To change the position of the lever, the operator simply raises the lever out of engagement with the collar clutch teeth, swings the lever to the desired position, then drops the lever back into engagement with the collar.



. . . right side of the knee; he selects the position which will give him the best view of the cutting area.



To adjust lever, operator merely raises it out of engagement with the clutch teeth, swings lever to desired position, then drops it back into engagement.



A slight pull and the saddle is clamped tight.

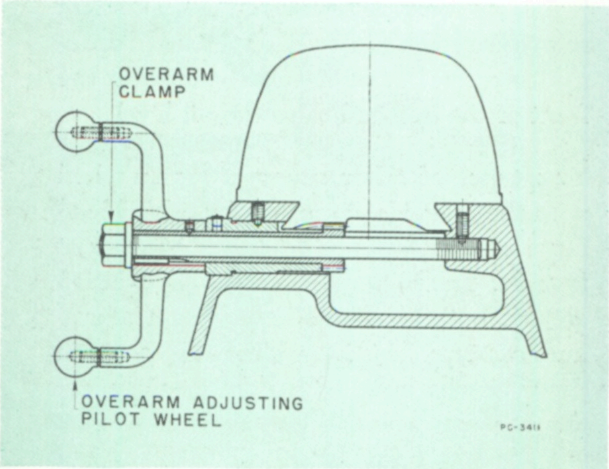
SCREW-CLAMPED ELEMENTS

Elements are screw-clamped for
Solid, tight grips;
But, if clamps aren't loosened,
Safety clutch slips.

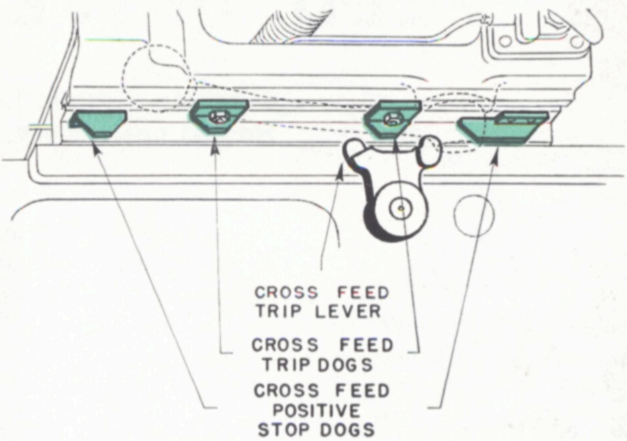
The movable elements are locked in place by screw clamps to assure a grip tight enough to prevent loosening while the machine is cutting.

If the operator forgets to loosen the saddle, table, or knee clamps before engaging feed, a safety clutch slips, preventing scoring of the surfaces which are being clamped upon.

Notice the design of the rear overarm clamp (sketch below): a clamping screw extends through the hub of the overarm adjustment pilot wheel. This design prevents "busted knuckles" for the operator, since he may turn the pilot wheel to adjust the overarm without danger of hitting his hands against the clamping nut.



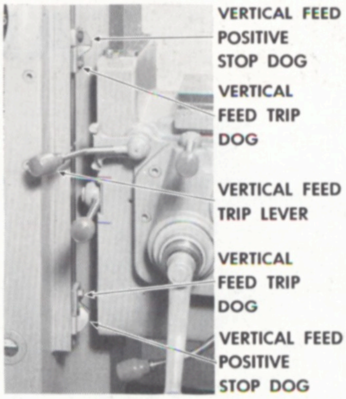
The rear overarm clamp and overarm adjusting pilot wheel—no "busted knuckles" here.

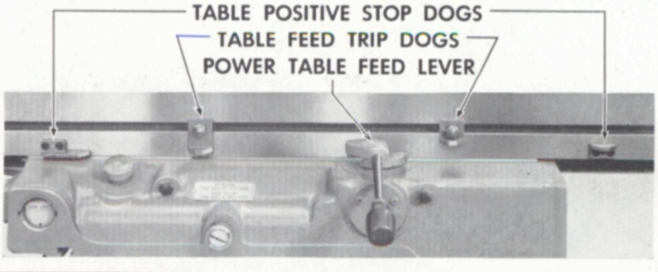


POSITIVE LIMIT DOGS

Should conventional dogs slip,
Positive dogs will cause trip.

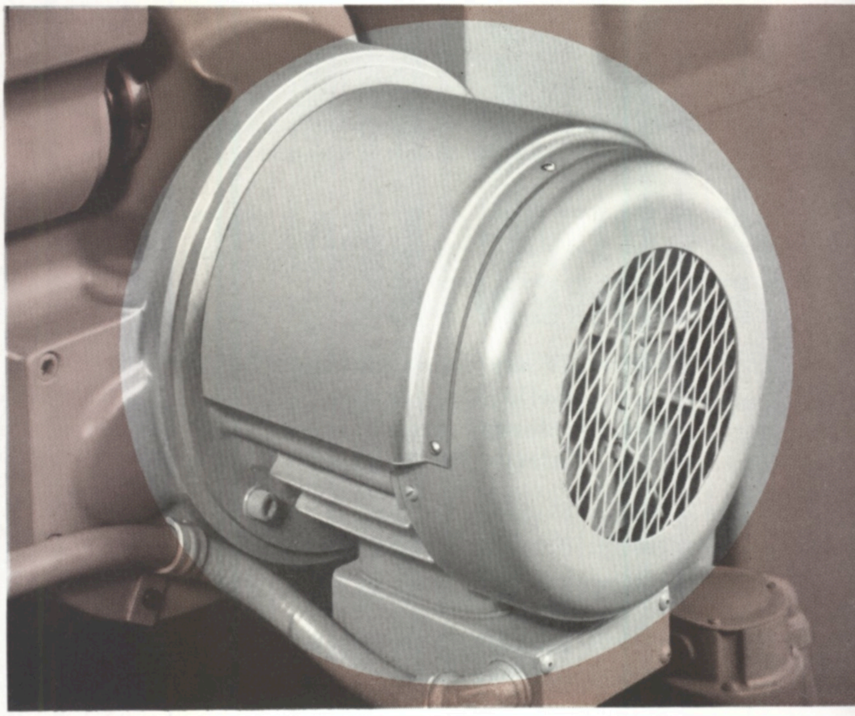
Although conventional trip dogs are provided for automatic kick-out of power feeds, positive limit dogs are also mounted on the table, saddle, and column. These dogs prevent damage which might occur to the feed drive mechanism when the operator fails to mount or lock the conventional trip dogs.





FEED DRIVE

**Separate, simple, full-power effect:
No lost power here—the drive is direct.**

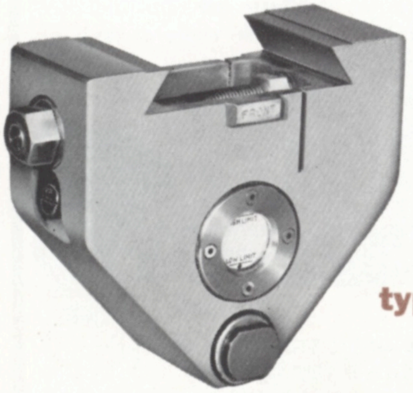


The knee has its own feed drive motor. This separate enclosed motor provides a simple, direct drive to the feed mechanism for knee, saddle, and table power movements. Gearing from the spindle drive in the machine column to the knee is eliminated, making the knee drive more accessible for easy maintenance. Then, too, this separate drive arrangement is more efficient: no power is lost in turning intricate gear trains from the column to the knee.

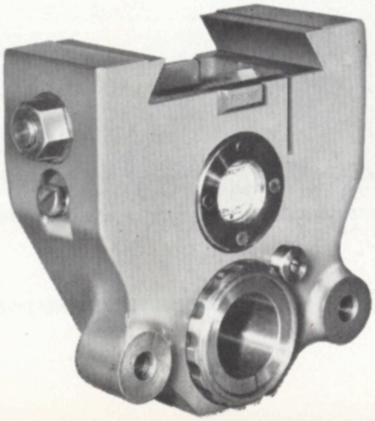
And there's plenty of reserve power for longitudinal, cross, and vertical feeds . . . 1½ hp for the 203-10 ML's and 205-10 MI's, 3 hp for the 307-14 and 410-14 MI's. (See page 17 for details on feeds.)

ARBOR SUPPORTS

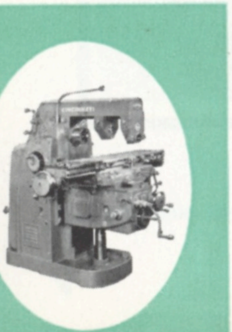
They're dust-tight and light.



type A



type B



Arbor supports are self oiling; the dust-tight reservoir at the center has sufficient capacity for several days. A glass window at the front of the unit indicates the oil level.

Two types of arbor supports are supplied with the machine: type "A" for arbors having a pilot end, type "B" (with or without lugs for brace) for arbors having bearing collars. Both types are light-weight aluminum castings. This is a welcomed feature to the man who must set up the machine, for the supports are safe and easy to handle.

REAR CONTROLS

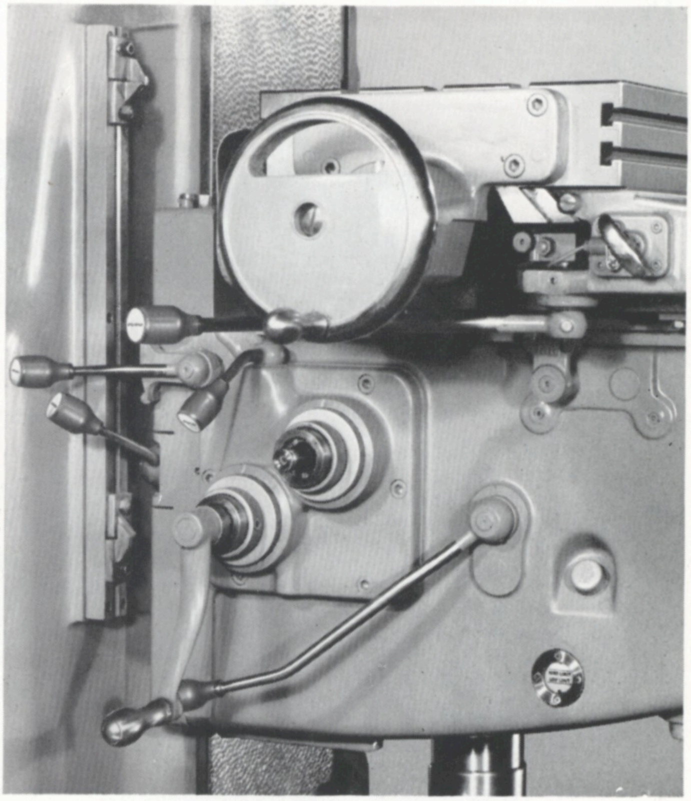
Rear controls let the operator stand Behind the table with controls at hand.

One of the most aggravating problems which a milling machine operator encounters is the one caused by the fixture or workpiece obstructing the surface being machined.

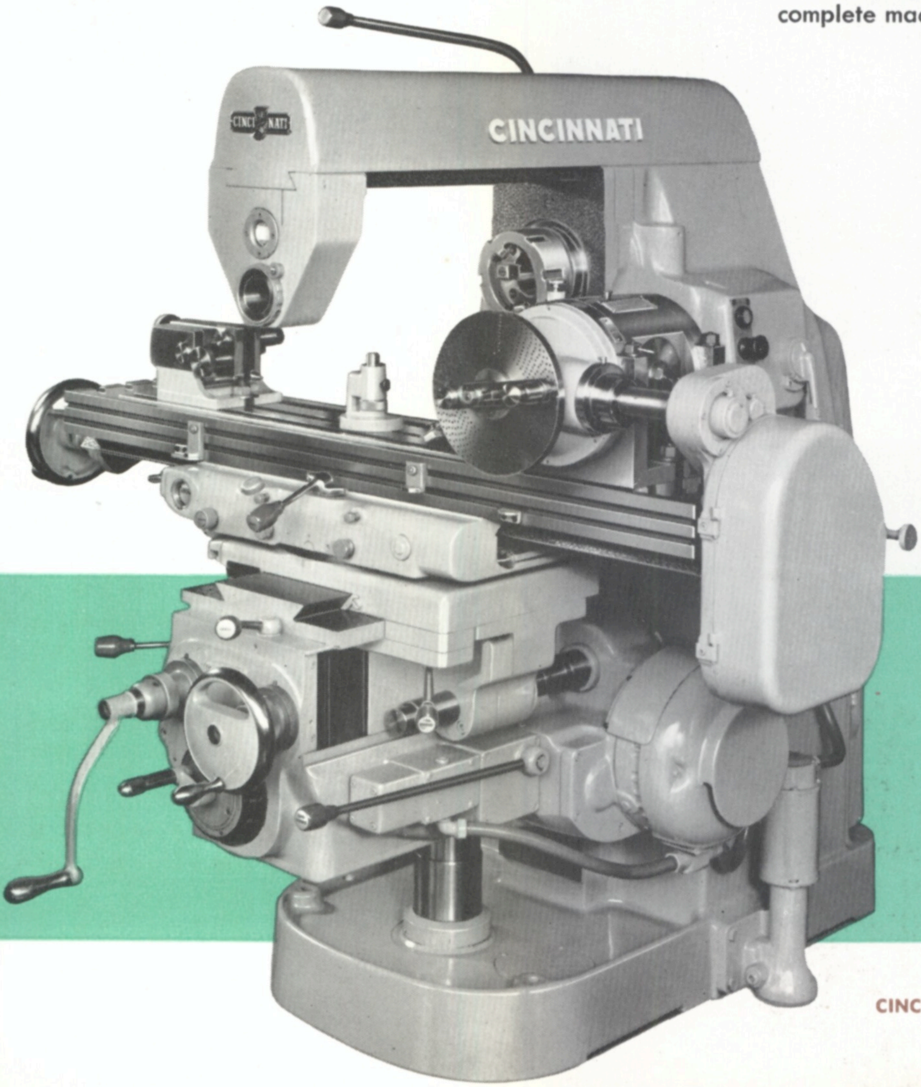
Standard equipment for the Cincinnati 307-14 and 410-14 MI Milling Machines includes a complete set of rear controls. These enable the operator to stand behind the machine table and still have complete control of his machine. At this rear position, he can easily see just what is going on during machining of a surface normally hidden from his view.

Controls included: hand adjustments and power feed directional controls for longitudinal, cross, and vertical movements; a rapid traverse control for the three movements is also included.

A rear power feed control for longitudinal movement is included as standard equipment on the ML's and 205-10 MI's; the complete set of rear controls for these machines is available at extra cost.

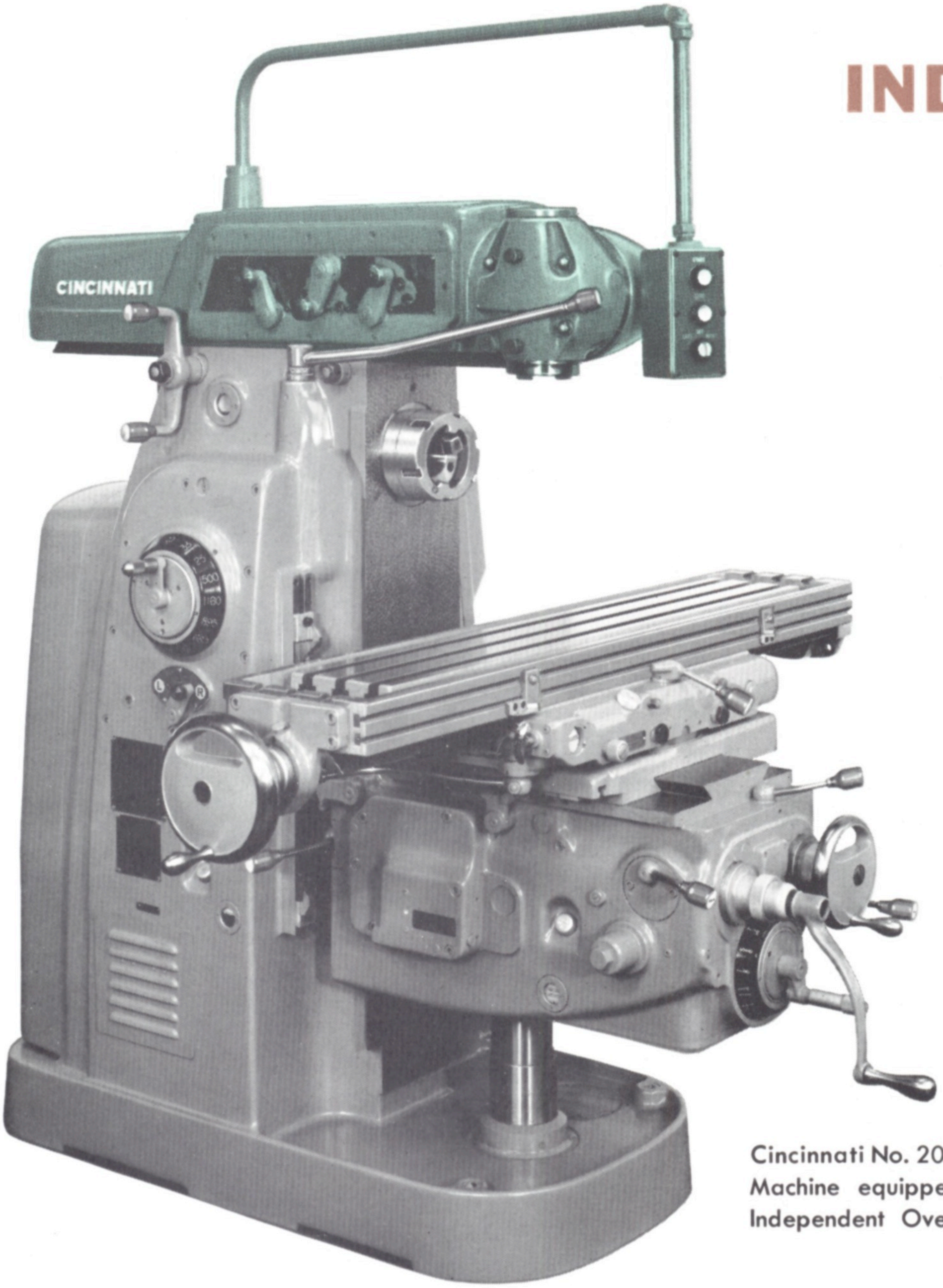


Rear controls — conveniently grouped for complete machine control at rear of table.



Standard equipment for this Cincinnati 307-14 MI Universal Milling Machine includes a complete set of rear controls.

INDEPENDENT

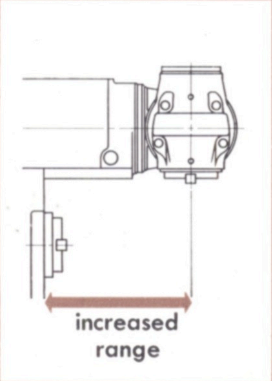


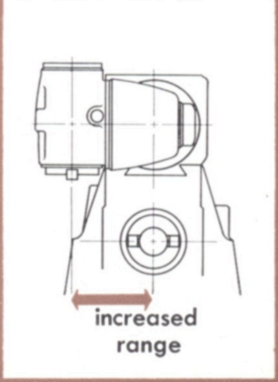
Cincinnati No. 205-10 MI Milling Machine equipped with 2 hp Independent Overhead Spindle

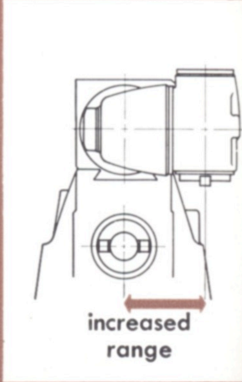
Range

and

Versatility...







VERHEAD SPINDLE

The Overhead Spindle gives these machines the ability To mill a wider range, increase their versatility.

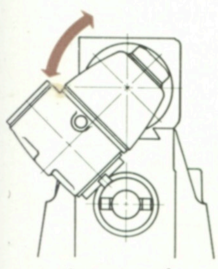
Vertical milling, angular milling, multiple-surface milling as well as horizontal milling can be assigned to a Cincinnati ML or MI Horizontal Milling Machine equipped with the Cincinnati Independent Overhead Spindle.

Two styles of the Independent Overhead Spindle are available: a 2 hp unit for the 205-10 MI's, a 3 hp unit for the 307-14 and 410-14 MI's. Both styles are completely self-contained: motor, drive mechanism, speed change mechanism, and controls function entirely separately from the rest of the machine.

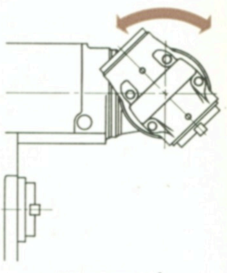
For either style two different milling heads are available at the time of your order: a fixed-spindle head and a head with provision for hand quill feed. Each head swivels through 360° and can be mounted on the face of the Independent Overhead Spindle overarm or onto a right-angle elbow for a double swivel arrangement. Neither head interferes with normal horizontal milling setups requiring arbor supports. So *an angular or vertical milling operation can be combined with a horizontal milling operation.* In addition, the cutting range of the machine is increased – both horizontally and vertically.

The 2 hp Independent Overhead Spindle offers 8 lever-selected speeds: 100, 140, 215, 310, 490, 700, 1070, and 1530 rpm. Spindle start-stop button and reversal switch are operated from a centralized pendant control.

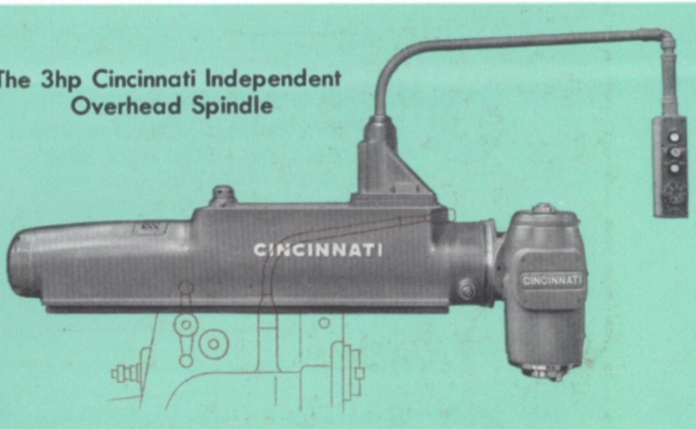
The 3 hp Independent Overhead Spindle offers either of 4 speed series: 50 to 750 rpm, 100 to 1500 rpm, 75 to 1125 rpm, or 150 to 2250 rpm. All speeds are selected electrically at the pendant control station by turning a speed selector dial; speeds may be changed at any time – even while cutting.



increased versatility

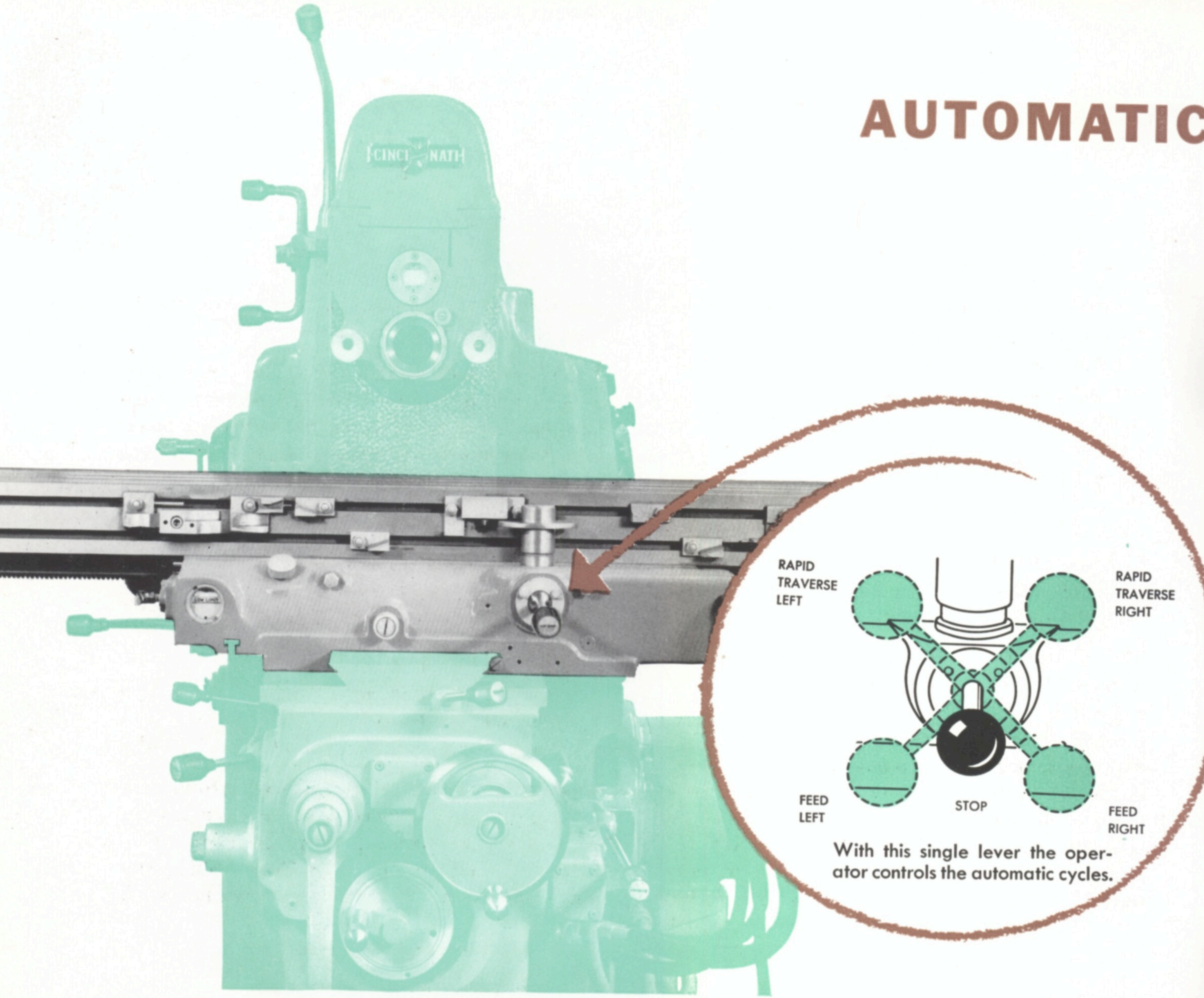


increased versatility

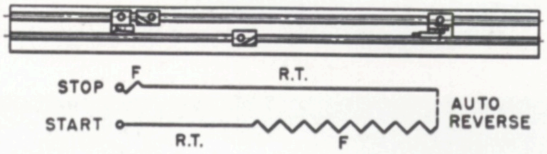


The 3hp Cincinnati Independent Overhead Spindle

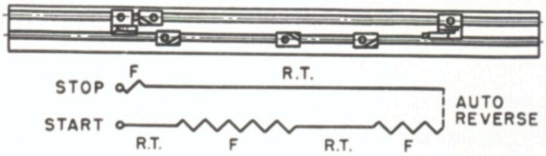
AUTOMATIC



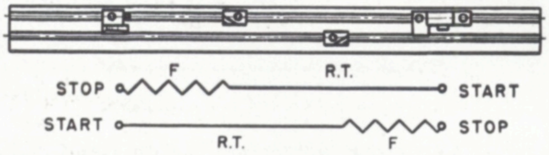
With this single lever the operator controls the automatic cycles.



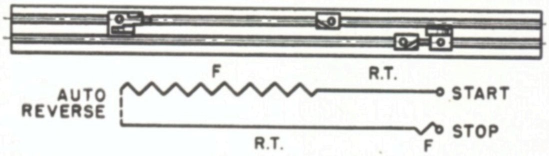
E A simple milling cycle: rapid traverse left, feed left, automatic reverse, rapid traverse right, short feed right, stop.



J Intermittent feed cycle: rapid traverse left, feed left, rapid traverse left, feed left, automatic reverse, rapid traverse right, short feed right, stop.

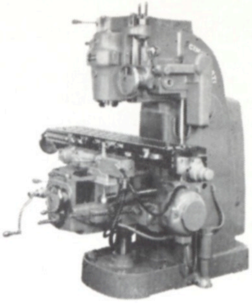


N Reciprocating cycle: rapid traverse left, feed left, stop, reverse by hand, rapid traverse right, feed right, stop.



F A simple milling cycle: rapid traverse right, feed right, automatic reverse, rapid traverse left, short feed left, stop.

CUTTING CYCLES



For you, completely automatic cycles can mean Production milling on a knee and column machine.

Low-cost automatic-cycle milling is combined with knee-and-column versatility in Cincinnati ML and MI Automatic Cycle Milling Machines. Every ML and MI feature of convenient, easy operation and quick setup has been retained on these automatic cycle machines. An additional setup convenience is the five-position manual table control lever. With this single lever, the operator can control completely the cutting cycle of the machine: he can feed or rapid traverse the table left, feed or rapid traverse the table right, or stop the table quickly at any desired point.

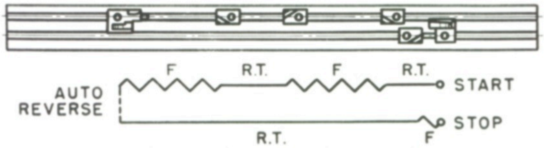
The automatic cycles are controlled by dogs mounted in two T-slots at the front of the table. Eight table control dogs are supplied with the machine: two feed dogs, two rapid traverse dogs, two reverse dogs, one stop dog, and one safety stop dog. Dogs in the upper T-slot control table movements to the right; table movements to the left are controlled by dogs in the lower slot. Reverse dogs change the table movement from feed to rapid traverse in the opposite direction; the center safety stop dog assures the operator time to load the fixtures during reciprocating cycles.

To assure smooth cutting action for reciprocating cycles (which require alternate up-milling and down-milling cuts), Cincinnati's Automatic Backlash Eliminator is included as a standard feature on automatic cycle machines. The Backlash Eliminator automatically engages during the cutting stroke, and automatically releases during other phases of the cycle. (See page 11.)

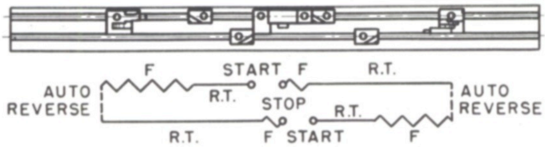
These machines are available with automatic table cycles:

No. 203-10 ML Plain
No. 205-10 MI Plain
No. 205-10 MI Vertical
No. 307-14 and 410-14 MI Plain

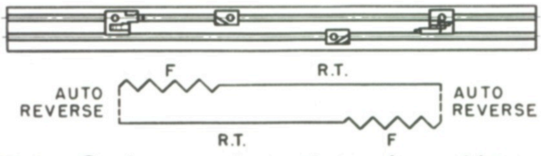
A variety of cycles are available, ranging from semi-automatic to fully automatic. To give you an idea of the many cost-reducing setups possible on Cincinnati ML and MI Automatic Cycle Milling Machines, several typical cycles are shown below.



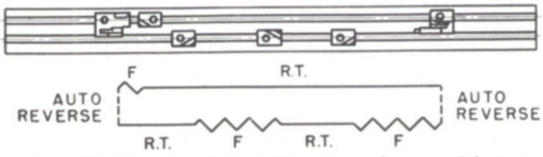
K **Intermittent feed cycle: rapid traverse right, feed right, rapid traverse right, feed right, automatic reverse, rapid traverse left, short feed left, stop.**



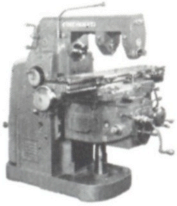
L **Reciprocating cycle (with center safety stop): rapid traverse left, feed left, automatic reverse, rapid traverse right, short feed right, stop. Rapid traverse right, feed right, automatic reverse, rapid traverse left, short feed left, stop.**



M **Continuous reciprocating cycle: rapid traverse left, feed left, automatic reverse, rapid traverse right, feed right, automatic reverse. These steps repeat continuously.**



O **Continuous intermittent cycle: rapid traverse left, feed left, rapid traverse left, feed left, automatic reverse, rapid traverse right, short feed right, automatic reverse. These steps repeat continuously.**



CINCINNATI DIVIDING HEAD

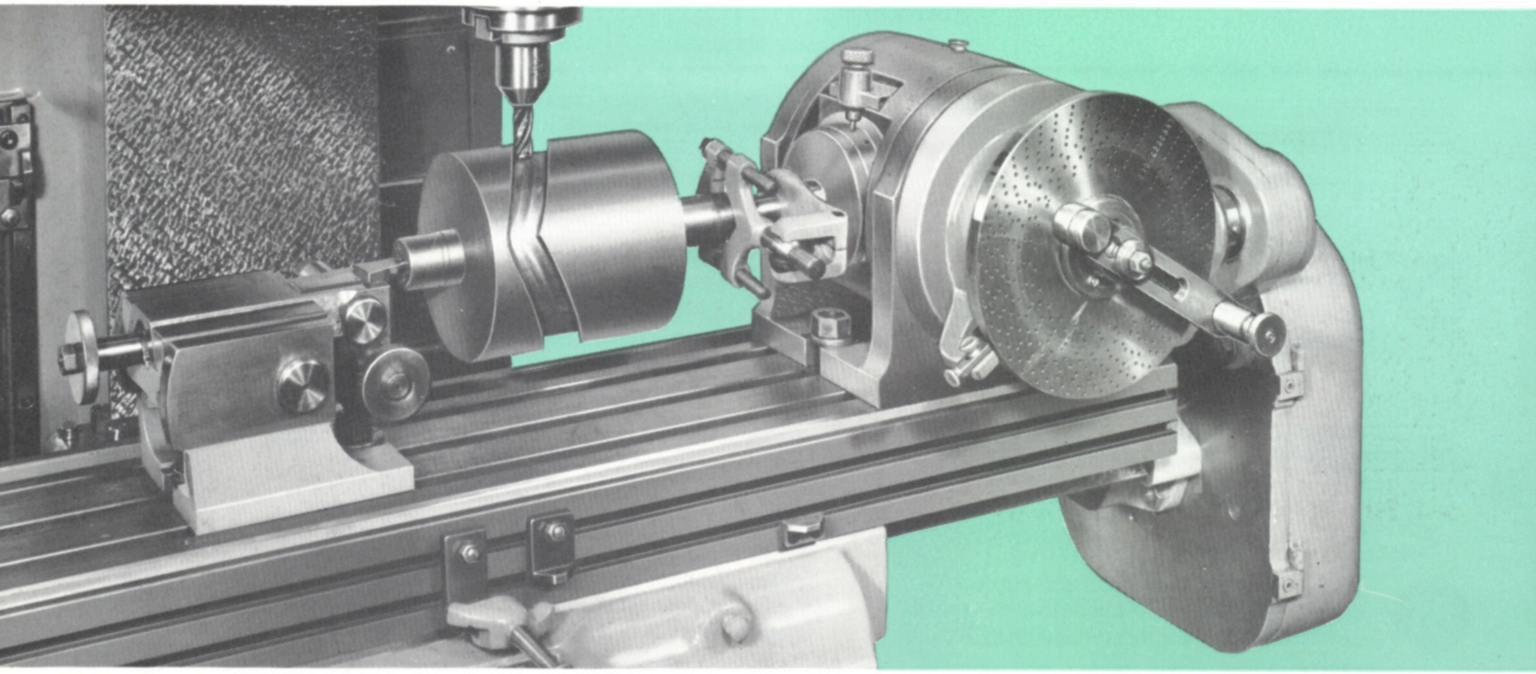
Expands variety of assigned milling jobs
To include cutters, various cams, worms, and hobs.

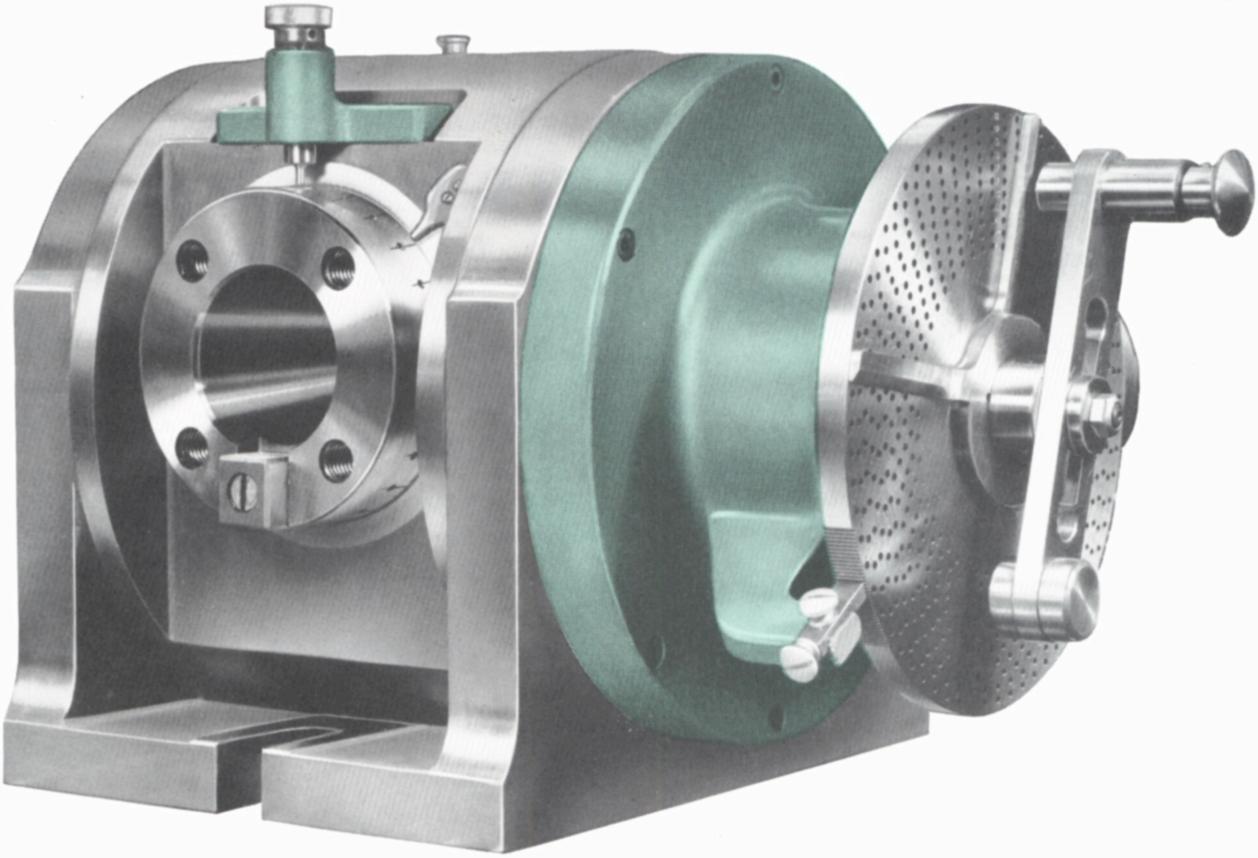
The Cincinnati Dividing Head and Driving Mechanism increases the variety of work which may be assigned to the machine to include spur and helical gears, worms, various types of cams, hobs, spline shafts, cutters and reamers, face mill cutter bodies, etc. The Dividing Head and Driving Mechanism are supplied as standard equipment with the Universal machines.

Two indexing devices are built into the Dividing Head: (1) the crank at the side . . . indexes the spindle through a 40 to 1 reduction, offering a choice of over 200 numbers, including all numbers up to 60; (2) the index pin which engages around the periphery of the spindle nose . . . a direct arrangement, for work requiring only a few equally spaced divisions. For work requiring a wider range of division, the Wide Range Divider can be built into the Dividing Head.

For taper work held between centers, the tailstock center support may be raised and lowered, and swiveled 10°. The face of the Dividing Head spindle has four threaded holes to receive a chuck or face plate for work which must be handled in this manner. For work which must be swiveled at an angle to the milling machine table, the Dividing Head swivel range (145° in a vertical plane) covers nearly all requirements.

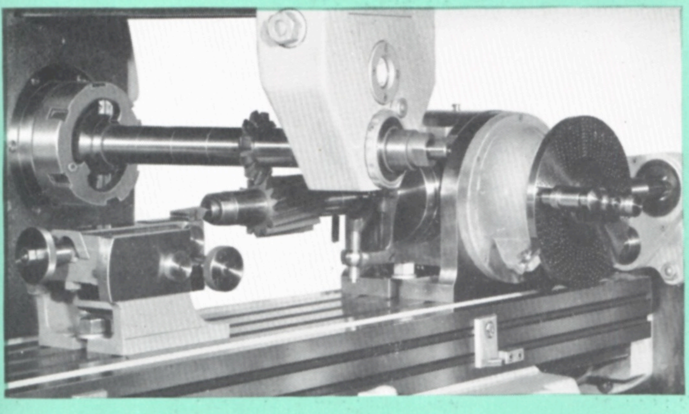
Using the Cincinnati Dividing Head in milling a cam and . . .



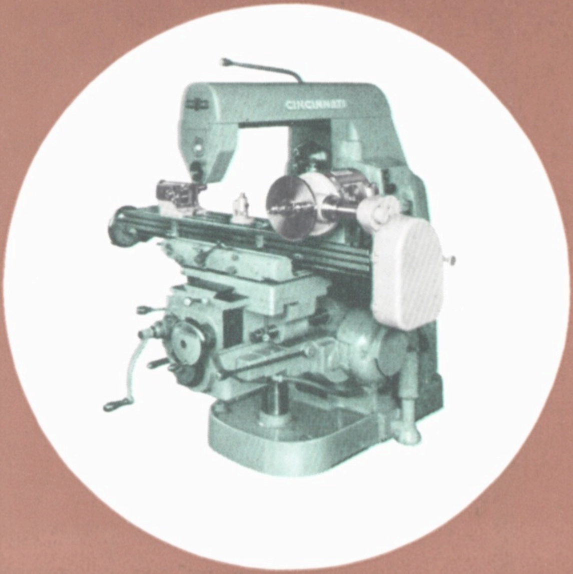


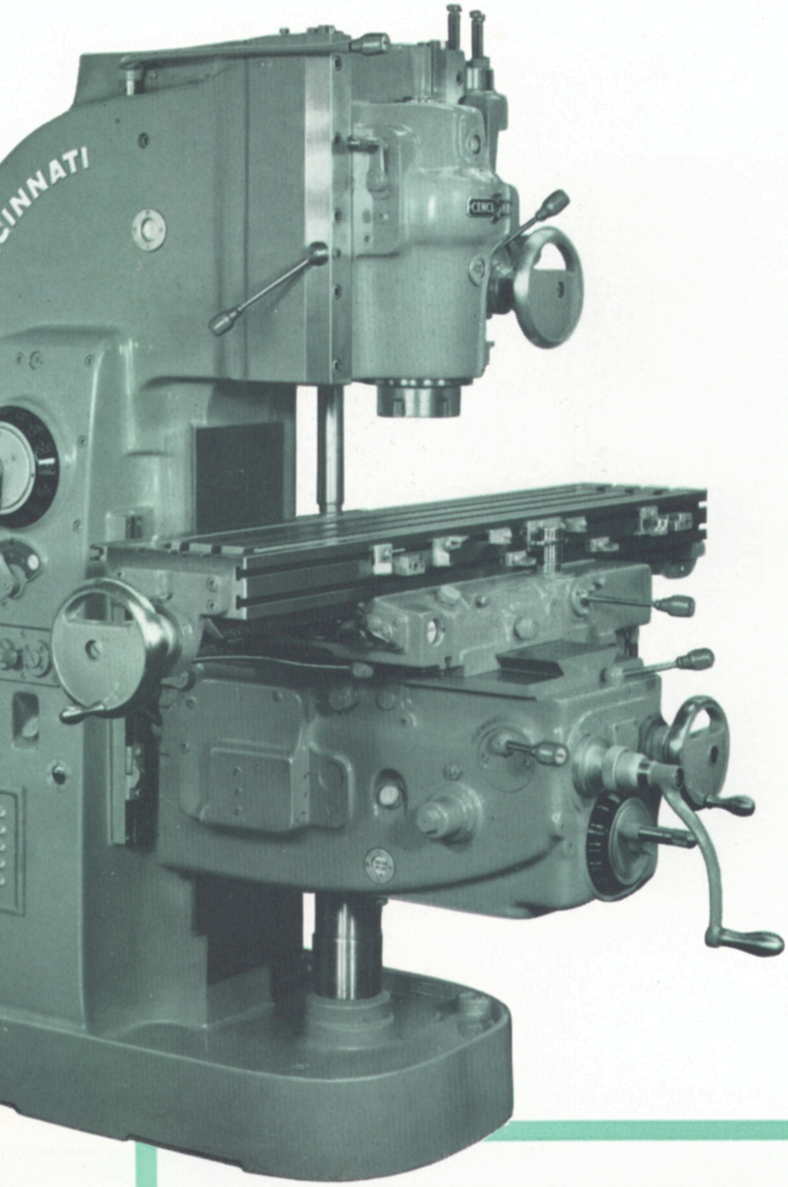
The Cincinnati 10″ Dividing Head . . . the No. 50 Series Spindle Taper permits use of standard arbors and adaptors.

. . . a helical gear tooth.



Standard equipment for all Universal ML's and MI's includes the Cincinnati Dividing Head and Driving Mechanism.





VERTICAL

No. 205-10 MI

The MI Vertical offers several important advantages to shops requiring machines of this type. For example, instead of the conventional rack and pinion, this new 205-10 MI Vertical has a screw and nut unit for vertical head adjustment and power traverse; this unit is completely enclosed and automatically flood-lubricated for sustained accuracy. *Power feed and power rapid traverse to the head, and a four-position turret stop with a dial depth gage, are included with the machine as standard equipment.* This equipment speeds up boring operations, facilitates the milling of production work having finished surfaces at various heights.

Below are some important vertical head specifications to consider when purchasing additional machines or replacement equipment within the No. 205-10 vertical range.

VERTICAL HEAD COMPARISON CHART

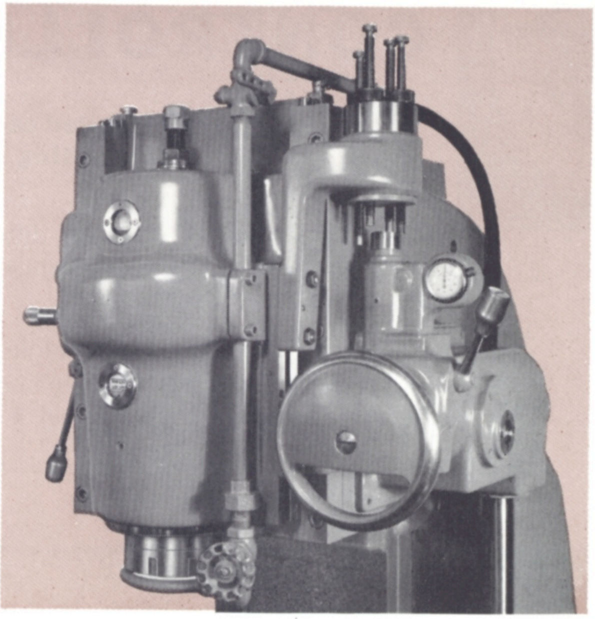
feature	Cincinnati 205-10 Vertical	Other Machine
1. Power feed and power rapid traverse to head	yes	......
2. Four position turret stop	yes	......
3. Power feeds to head	yes, Sixteen: ⅛″ to 15″ per min.	......
4. Power rapid traverse to head	yes, 75″ per minute	......
5. Screw feed to head	yes	......
6. Quick-acting taper gib clamp	yes	......
7. Full length bearing in ways, any position	yes	......
8. Individual lubrication system	yes	......
9. Scavenger pump to prevent leakage	yes	......
10. Automatic kick-out of vertical head handwheel	yes	......

MACHINES
Only

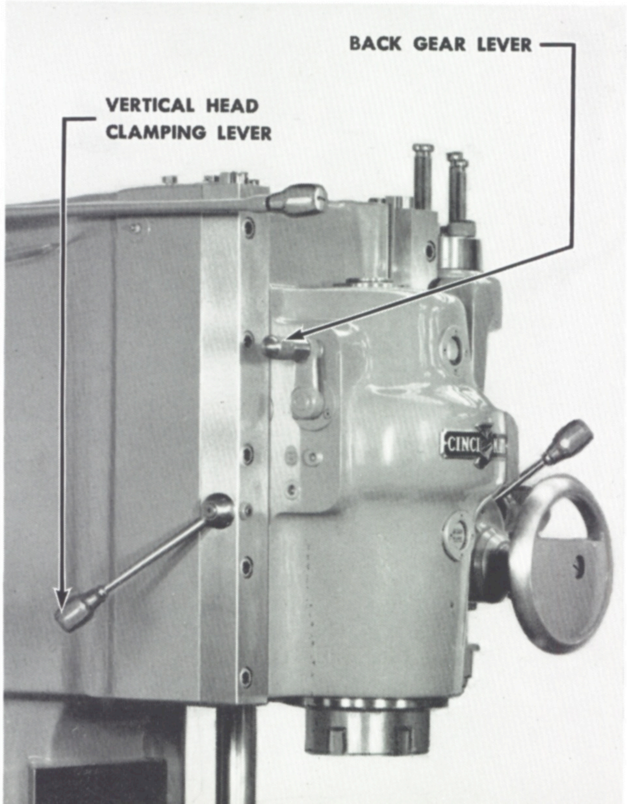
VERTICAL HEAD FEEDS

It's easy to select the rate
At which the cutter will be fed.
And power rapid traverse
Speeds retraction of the head.

It's just as easy to change power feeds to the head as it is to change the table feed rate . . . only one-half turn to the right or left of the feed change lever at the front of the knee. The instant power feed or power rapid traverse is engaged, the manual control handwheel kicks out of engagement, protecting the operator. Power rapid traverse for the vertical head, at the rate of 75 inches per minute is included as standard equipment. This feature is a time saver in retracting the head at the end of boring cuts, or when quick-changing collets.



Power feed, power rapid traverse to the head, 4-position turret stop with dial depth gage are standard equipment on the Cincinnati 205-10MI Vertical.



HEAD DRIVE

There's consistent speeds here
Because of the back gear.

Back gear drive to the vertical head maintains consistently-low and more desirable speeds in the transmission, stretching the life span of the anti-friction bearings as far as possible. With the exception of the change-over from one group of eight consecutive spindle speeds to another (accomplished with the back gear lever), speeds are selected with the half turn of a single crank, as for horizontal machines.

Note the convenient vertical head clamping lever. Through a taper gib wedge, it clamps the head accurately, firmly, and along the full length of the gib.

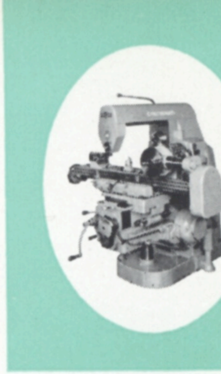
CONTROLLED CASTINGS

**Controlled cast iron—fifteen grades—means for you:
Each casting is poured for the job it's to do.**

Cincinnati's Foundry pours 15 different grades of controlled cast iron; the proper grade is selected for each part of the machine, the function of the part to be cast determining the grade of iron selected.

Massive main column, knee, saddle, table, overarm – each unit is made of high-grade dense cast iron with thick walls, each is reinforced with heavy internal ribs to withstand the stress imposed by heavy cuts.

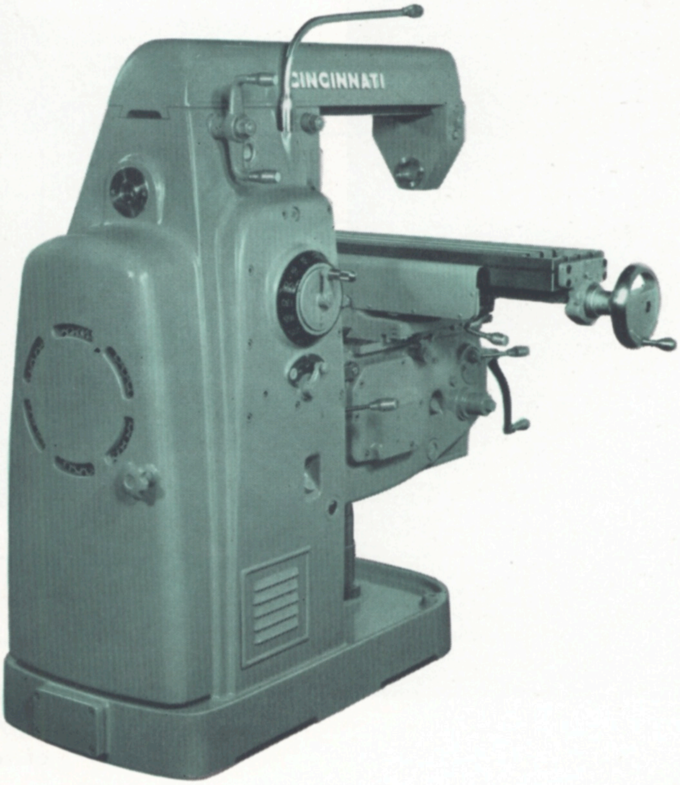
And the units assemble to give a solid, sturdy machine with . . .



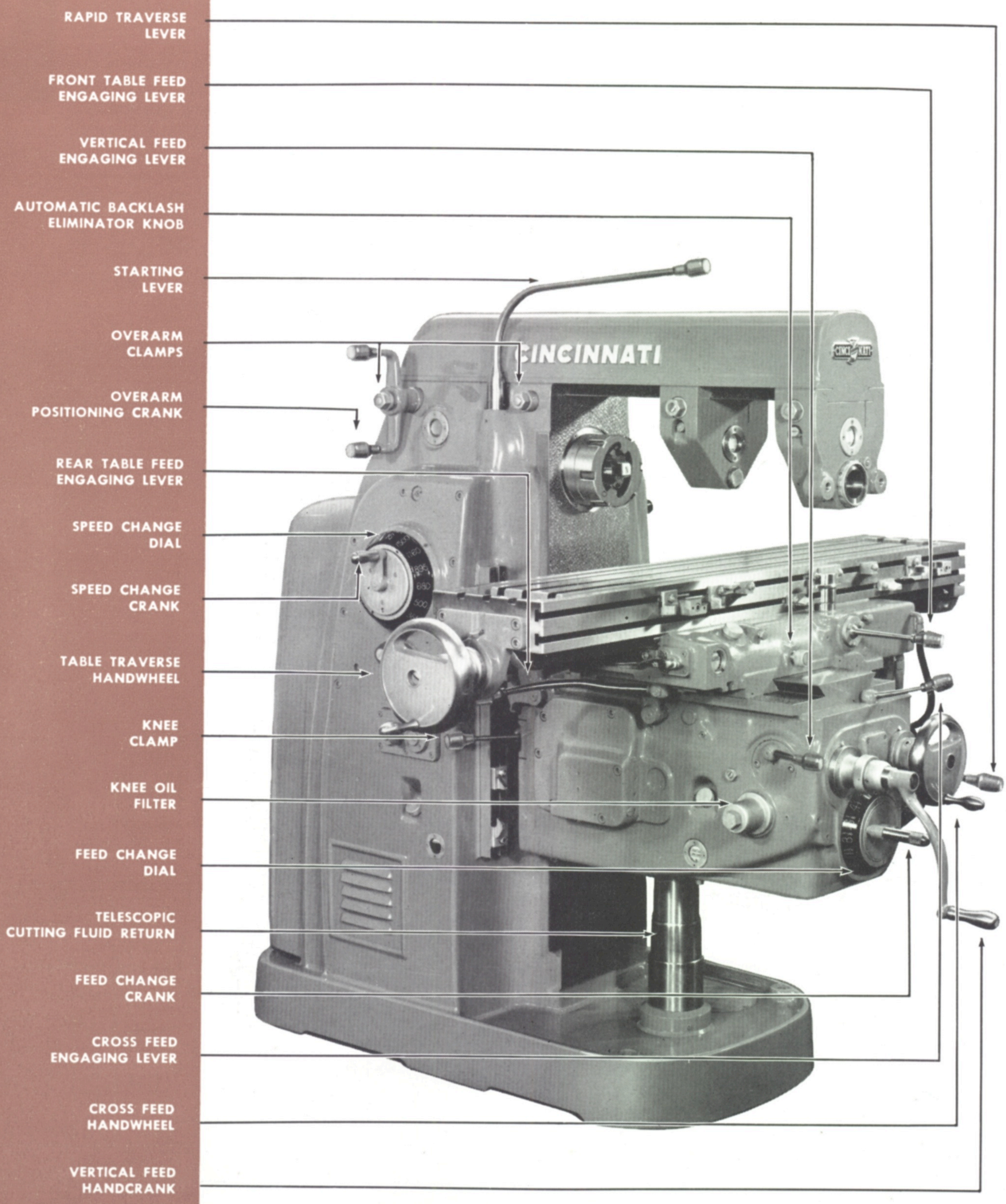
. . . CLEAN SMOOTH LINES

**A good-looking machine
That's easy to clean.**

Here's a rear view of a Cincinnati 205-10 MI Plain Milling Machine. The lines are clean, smooth, well-blended. Besides meaning that you'll have a *good-looking* machine, this clean exterior means that you'll have a machine which will be *easy to keep clean:* there is a minimum of hard-to-get-at crevices and sharp corners.

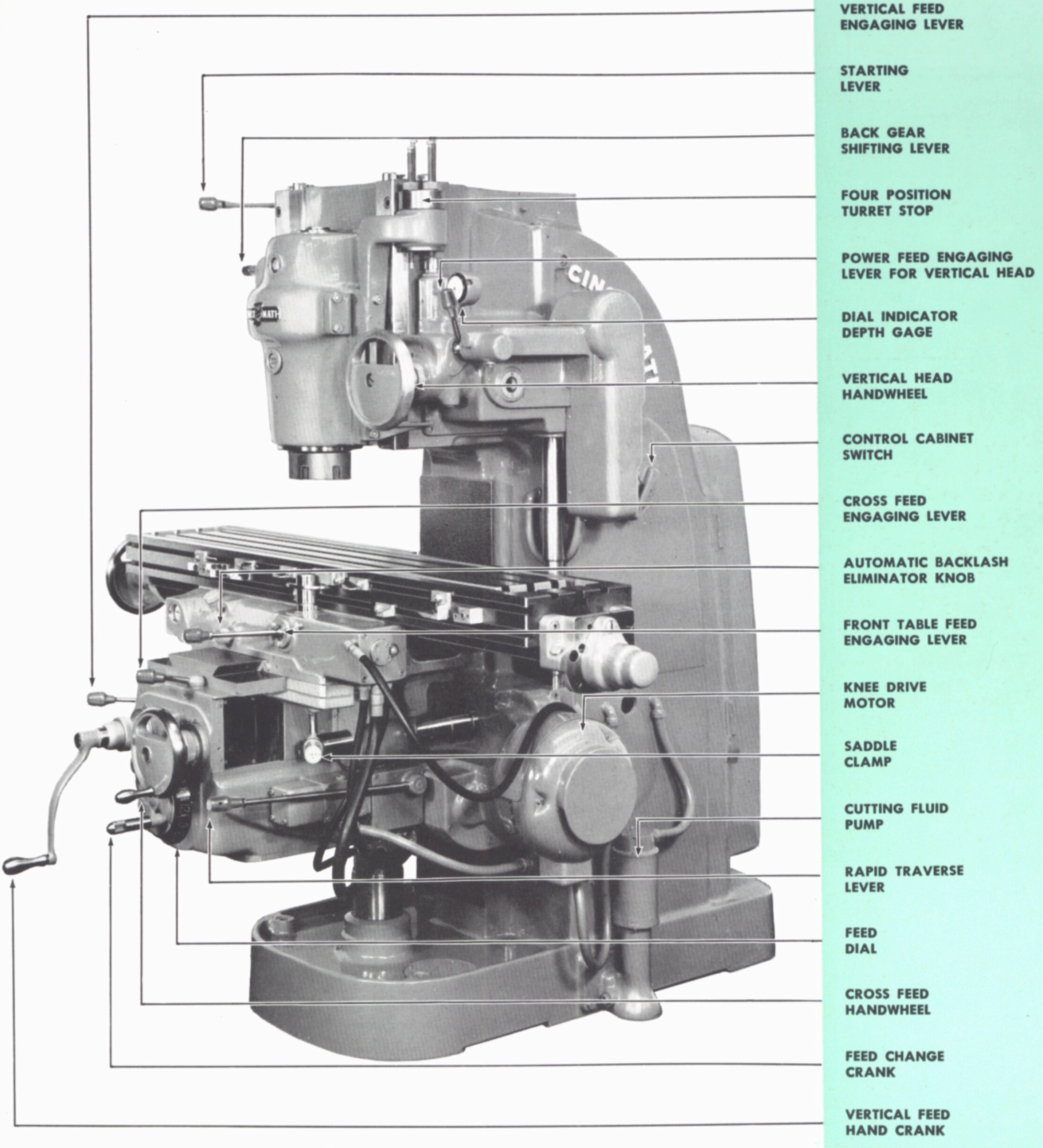


AN INDEX TO OPE



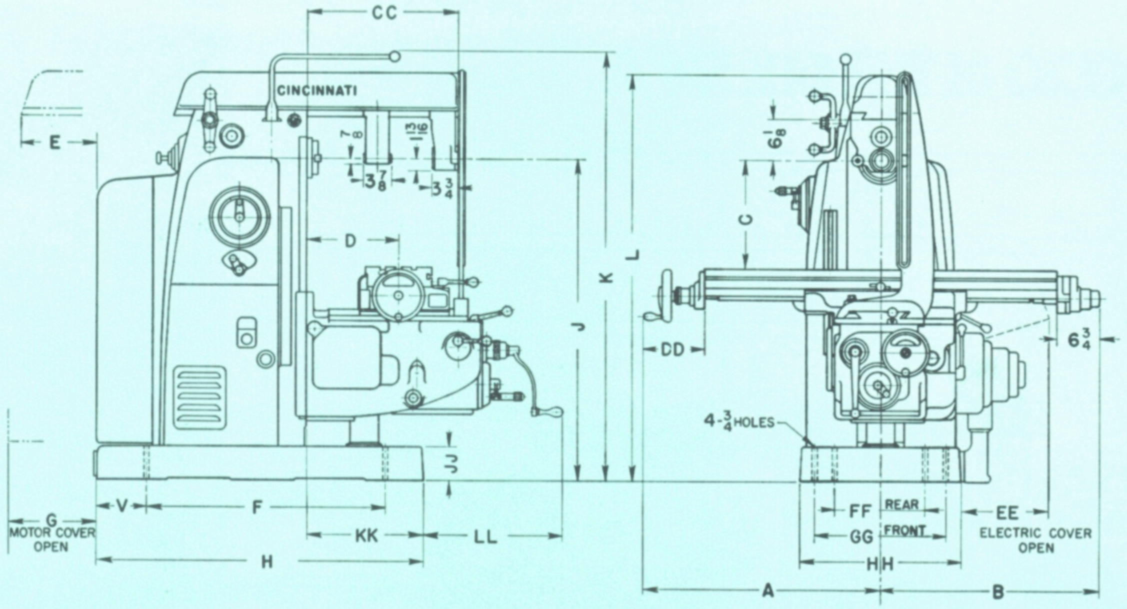
Cincinnati 205-10 MI Plain Milling Machine.
(307-14 and 410-14 MIs have complete set of rear controls. See page 23.)

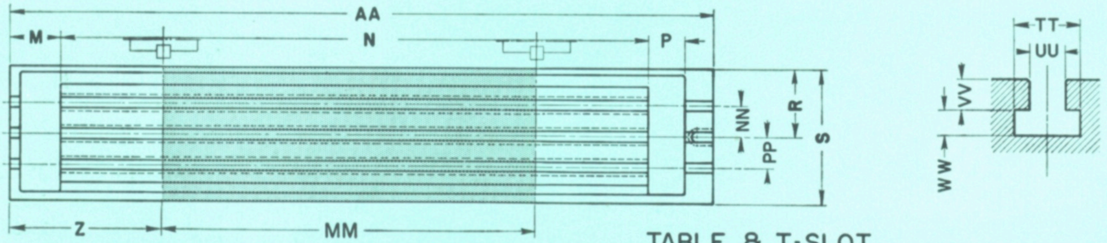
ATING CONTROLS



Cincinnati 205-10MI Vertical Milling Machine.

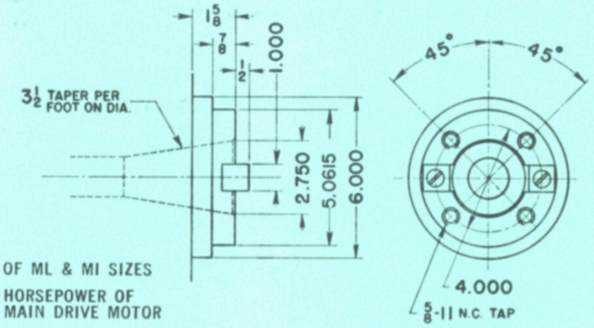
(Shown with Automatic Head Retraction)





SHADED SURFACE INDICATES MAXIMUM CUTTING AREA

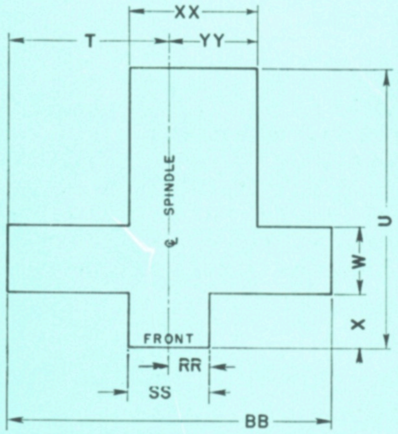
TABLE & T-SLOT



SPINDLE NOSE

STANDARD FLANGED END WITH NO. 50 SERIES TAPER

PC-5309



FLOOR PLAN

EXPLANATION OF ML & MI SIZES

HORSEPOWER OF MAIN DRIVE MOTOR

203 - 10

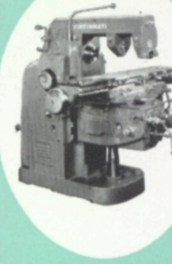
SIZE OF MACHINE

TABLE WIDTH (INCHES)

SIZE	A		B		C		D			E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Z
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	W/OUT BRACE	WITH BRACE	MIN.																		
203-10 ML	49 1/16	21 1/16	49 7/16	21 7/16	16½	0	17 9/16	13⅝	7 9/16	16½	33¾	16¼	43⅞	46¼	62⅝	59⅜	3¾	45 9/16	2¾	4 11/16	9 11/16	49 5/16	81 3/16	4⅜	19 11/16	16 3/16	11¾
205-10 MI	49 1/16	21 1/16	49 7/16	21 7/16	18½	0	17 9/16	13⅝	7 9/16	12½	35¾	14¼	47⅞	48¼	64⅝	61⅜	3¾	45 9/16	2¾	5	10	49 5/16	83 3/16	6⅜	20	16 3/16	11¾
307-14 MI	57 1/16	23 1/16	58⅛	24⅛	20	0	21⅞	20	9⅞	19⅛	43½	17½	56½	51½	70¾	65⅞	3¾	54	2¾	7	14	57 5/16	100 5/16	6⅝	26	18 1/16	11⅛
410-14 MI	65 1/16	23 1/16	66⅛	24⅛	20	0	21⅞	20	9⅞	19⅛	43½	17½	56½	51½	70¾	65⅞	3 9/16	68⅜	2 9/16	7	14	65 1/16	100 5/16	6⅝	26	18 1/16	11⅛

SIZE	AA	BB	CC		DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	UU	VV	WW	XX	YY
			WITH BRACE	W/OUT BRACE																			
203-10 ML	54 7/16	99	22 11/16	25	9 5/16	14½	13½	19½	24	5⅛	17½	21 1/16	28	2 5/16	2 5/16	11	22	1¼	11/16	¾	31/64	38½	26½
205-10 MI	54 7/16	99	22 11/16	25	9 5/16	14½	13½	19½	24	5⅛	17½	21 1/16	28	2 5/16	2 5/16	11	22	1¼	11/16	¾	31/64	38½	26½
307-14 MI	62½	115 5/16	30 13/16	32⅜	11 15/16	18¼	16	24	28½	5	22	24 11/16	34	3¼	3¼	13	24	1 15/32	13/16	⅞	⅝	51	31
410-14 MI	70½	131 3/16	30 13/16	32⅜	11 15/16	18¼	16	24	28½	5	22	24 11/16	42	3¼	3¼	13	24	1 15/32	13/16	⅞	⅝	51	33

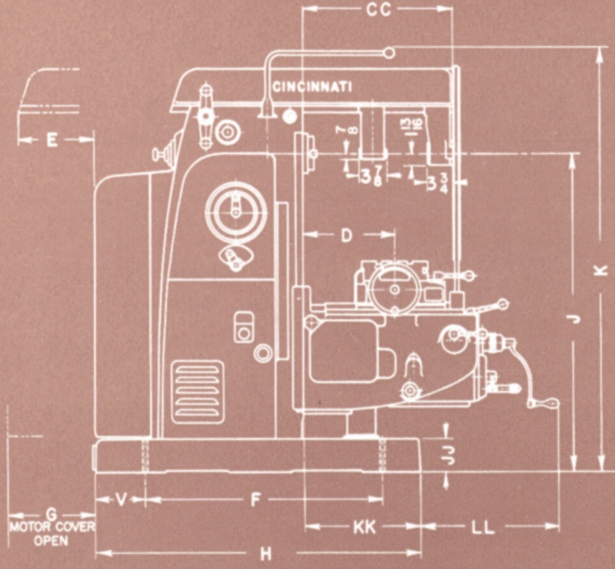
PLAIN MACHINES

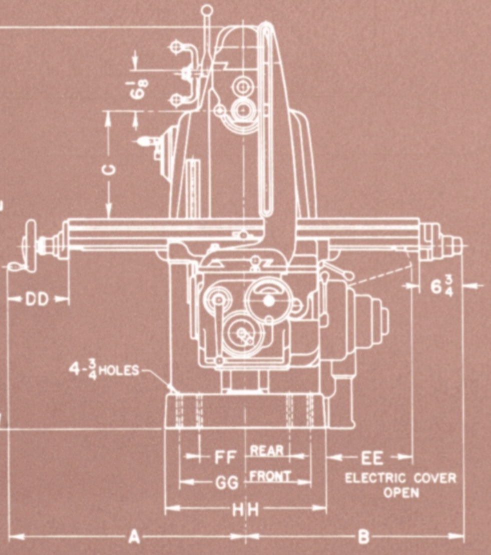


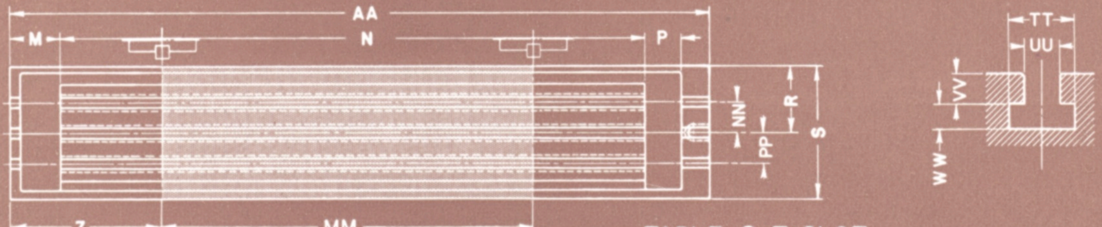
GENERAL SPECIFICATIONS

	203-10 ML	205-10 MI	307-14 MI	410-14 MI
TABLE				
Working surface	54⁷⁄₁₆″ x 10″	54⁷⁄₁₆″ x 10″	62½″ x 14″	70½″ x 14″
Size over-all	54⁷⁄₁₆″ x 10″	54⁷⁄₁₆″ x 10″	62½″ x 14″	70½″ x 14″
T-slots, number and size	Three—¹¹⁄₁₆″	Three—¹¹⁄₁₆″	Three—¹³⁄₁₆″	Three—¹³⁄₁₆″
Distance between T-slots	2⁵⁄₁₆″	2⁵⁄₁₆″	3¼″	3¼″
RANGE				
Longitudinal	28″	28″	34″	42″
Cross	10″	10″	12″	12″
Vertical	16½″	18½″	20″	20″
Centerline spindle to top of table Max.	16½″	18½″	20″	20″
Centerline spindle to top of table Min.	0	0	0	0
SPINDLE				
Spindle nose	No. 50 Std.	No. 50 Std.	No. 50 Std.	No. 50 Std.
Hole for draw-in bolt	1⅛″	1⅛″	1⅛″	1⅛″
Speeds Number	16	16	16	16
Speeds Range	25-1500 rpm	25-1500 rpm	25-1500 rpm	33-2000 rpm
	25, 33, 43, 56, 76, 100, 130, 168, 225, 295, 385, 500, 680, 895, 1160, 1500 rpm. Low range of spindle speeds 20 to 1200 rpm, or high range of spindle speeds, 33 to 2000 rpm, may be obtained at the time the order is placed.			33, 43, 56, 76, 100, 130, 168, 225, 295, 385, 500, 680, 895, 1160, 1500, 2000 rpm.
FEED				
Number of feeds	16	16	16	16
Range Longitudinal and cross	¼-30″/min.	¼-30″/min.	¼-30″/min.	¼-30″/min.
Range Vertical	⅛-15″/min.	⅛-15″/min.	⅛-15″/min.	⅛-15″/min.
¼, 5/16, 7/16, ⅝, ⅞, 1¼, 1¾, 2⅜, 3¼, 4½, 6⅛, 8⅜, 11½, 16, 22, 30″ per min. Vertical rates are ½ the foregoing. An optional feed range of ½″ to 60″ per minute can be supplied at the time the order is placed. Longitudinal, cross and vertical feed rates are then in the same proportion as standard.				
POWER RAPID TRAVERSE (Spindle running or stopped)				
Longitudinal and Cross	150″/min.	150″/min.	150″/min.	150″/min.
Vertical	75″/min.	75″/min.	75″/min.	75″/min.
OVERARM (Dynapoise)				
Underside to centerline of spindle	6⅛″	6⅛″	6⅛″	6⅛″
DRIVE				
Spindle drive motor	3 hp	5 hp	7½ or 10* hp	10 hp
Feed drive motor	1½ hp	1½ hp	3 hp	3 hp
FLOOR SPACE				
Maximum size	99″x81³⁄₁₆″	99″x83³⁄₁₆″	115⁵⁄₁₆″x100⁵⁄₁₆″	131³⁄₁₆″x100⁵⁄₁₆″
Area	56 sq. ft.	58 sq. ft.	80 sq. ft.	90 sq. ft.
SHIPPING DATA				
Net weight	3650 lbs.	4650 lbs.	6500 lbs.	6675 lbs.
Gross weight, domestic	4250 lbs.	5300 lbs.	7500 lbs.	7675 lbs.
Gross weight, export	4550 lbs.	5600 lbs.	7700 lbs.	7875 lbs.
Shipping case Size	72″x68″x42″	72″x70″x42″	90″x73″x50″	90″x73″x50″
Shipping case Volume	119 cu. ft.	123 cu. ft.	190 cu. ft.	190 cu. ft.
CODE NAMES				
Conventional Table Feed Machines	YUWHA	YUWHB	YUWHC	YUWHD
Automatic Table Feed Machines	YUWHJ	YUWHK	YUWHL	YUWHM

NOTE: General specifications for Plain Machines with and without Automatic Table Cycles.
* 10 hp, 33 to 2000 rpm (extra cost).

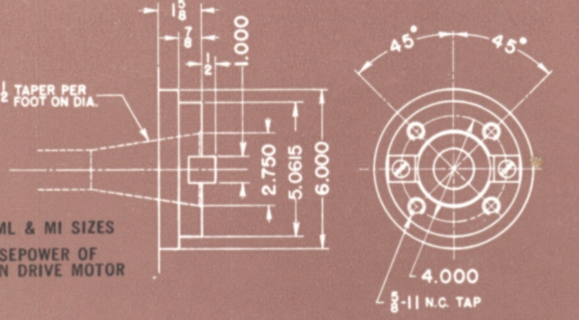






SHADED SURFACE INDICATES MAXIMUM CUTTING AREA

TABLE & T-SLOT



PC-5309

SPINDLE NOSE

STANDARD FLANGED END WITH NO. 50 SERIES TAPER

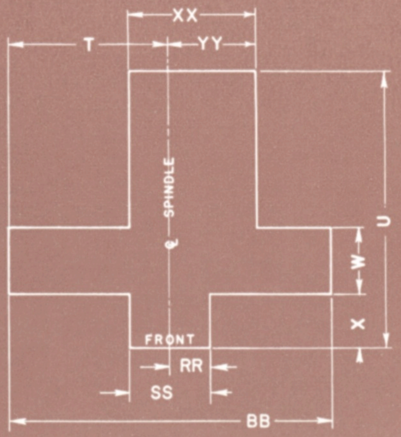
EXPLANATION OF ML & MI SIZES

HORSEPOWER OF MAIN DRIVE MOTOR

203 - 10

SIZE OF MACHINE

TABLE WIDTH (INCHES)

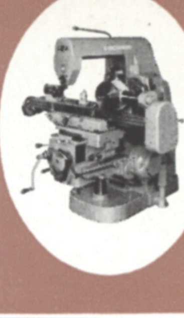


FLOOR PLAN

SIZE	A		B		C		D			E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Z
	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	W/OUT BRACE	WITH BRACE	MIN.																		
203-10 ML	50 9/16	22 9/16	47 15/16	19 15/16	16	0	17 9/16	13 5/8	7 9/16	16 1/2	33 3/4	16 1/4	43 7/8	46 1/4	62 5/8	59 3/8	3 3/4	45 9/16	2 3/4	4 11/16	9 11/16	50 13/16	81 3/16	4 3/8	19 1/2	16 3/16	13 1/4
205-10 MI	50 9/16	22 9/16	47 15/16	19 15/16	18	0	17 9/16	13 5/8	7 9/16	12 1/2	35 3/4	14 1/4	47 7/8	48 1/4	64 5/8	61 3/8	3 3/4	45 9/16	2 3/4	5	10	50 13/16	83 3/16	6 3/8	20	16 3/16	13 1/4
307-14 MI	58 3/16	24 3/16	57	23	19	0	21 7/8	21	9 7/8	19 1/8	43 1/2	17 1/2	56 1/2	51 1/2	70 3/4	65 7/8	3 3/4	54	2 3/4	7	14	58 7/16	100 5/16	6 5/8	26	18 1/16	12 3/16
410-14 MI	66 3/16	24 3/16	65	23	19	0	21 7/8	21	9 7/8	19 1/8	43 1/2	17 1/2	56 1/2	51 1/2	70 3/4	65 7/8	3 9/16	68 3/8	2 9/16	7	14	66 3/16	100 5/16	6 5/8	26	18 1/16	12 1/4

SIZE	AA	BB	CC		DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	UU	VV	WW	XX	YY
			WITH BRACE	W/OUT BRACE																			
203-10 ML	54 7/16	98 3/4	22 11/16	25	9 5/16	14 1/2	13 1/2	19 1/2	24	5 1/8	17 1/2	21 1/16	28	2 5/16	2 5/16	11	22	1 1/4	11/16	3/4	31/64	38 1/2	26 1/2
205-10 MI	54 7/16	98 3/4	22 11/16	25	9 5/16	14 1/2	13 1/2	19 1/2	24	5 1/8	17 1/2	21 1/16	28	2 5/16	2 5/16	11	22	1 1/4	11/16	3/4	31/64	38 1/2	26 1/2
307-14 MI	62 1/2	115 5/16	30 13/16	32 3/8	11 15/16	18 1/4	16	24	28 1/2	5	22	24 11/16	34	3 1/4	3 1/4	13	24	1 15/32	13/16	7/8	5/8	51	31
410-14 MI	70 1/2	131 3/16	30 13/16	32 3/8	11 15/16	18 1/4	16	24	28 1/2	5	22	24 11/16	42	3 1/4	3 1/4	13	24	1 15/32	13/16	7/8	5/8	51	33

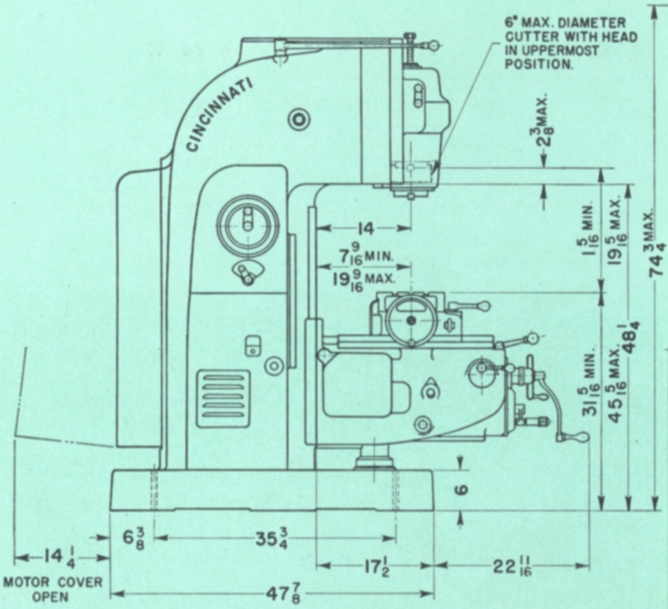
UNIVERSAL MACHINES

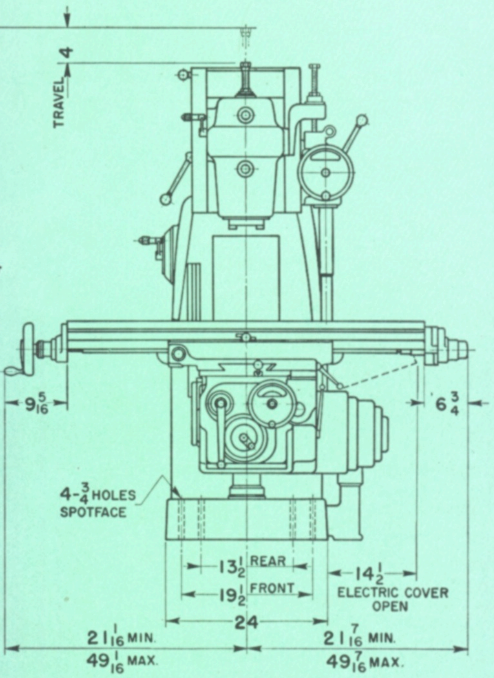


GENERAL SPECIFICATIONS

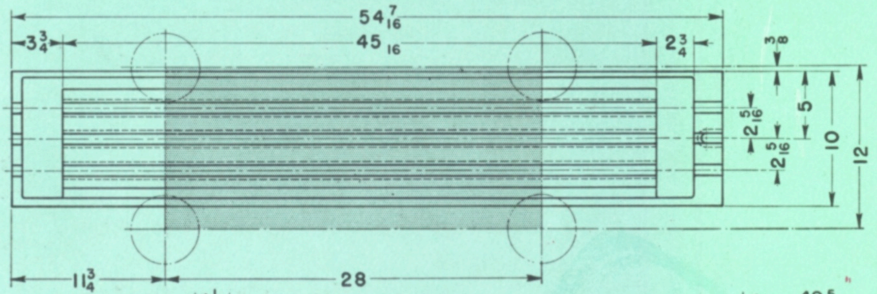
	203-10 ML	205-10 MI	307-14 MI	410-14 MI
TABLE				
Working surface	54 7/16″ x 10″	54 7/16″ x 10″	62½″ x 14″	70½″ x 14″
Size over-all	54 7/16″ x 10″	54 7/16″ x 10″	62½″ x 14″	70½″ x 14″
T-slots, number and size	Three—11/16″	Three—11/16″	Three—13/16″	Three—13/16″
Distance between T-slots	2 5/16″	2 5/16″	3¼″	3¼″
Swivels	46° R and L	46° R and L	46° R and L	46° R and L
RANGE				
Longitudinal	28″	28″	34″	42″
Cross	10″	10″	12″	12″
Vertical	16″	18″	19″	19″
Centerline spindle to top of table Max.	16″	18″	19″	19″
Min.	0	0	0	0
SPINDLE				
Spindle nose	No. 50 Std.	No. 50 Std.	No. 50 Std.	No. 50 Std.
Hole for draw-in bolt	1⅛″	1⅛″	1⅛″	1⅛″
Speeds Number	16	16	16	16
Range	25-1500 rpm	25-1500 rpm	25-1500 rpm	33-2000 rpm
	25, 33, 43, 56, 76, 100, 130, 168, 225, 295, 385, 500, 680, 895, 1160, 1500 rpm. Low range of spindle speeds 20 to 1200 rpm, or high range of spindle speeds, 33 to 2000 rpm, may be obtained at the time the order is placed.			33, 43, 56, 76, 100, 130, 168, 225, 295, 385, 500, 680, 895, 1160, 1500, 2000 rpm.
FEED				
Number of feeds	16	16	16	16
Range Longitudinal and cross	¼-30″/min.	¼-30″/min.	¼-30″/min.	¼-30″/min.
Vertical	⅛-15″/min.	⅛-15″/min.	⅛-15″/min.	⅛-15″/min.
¼, 5/16, 7/16, ⅝, ⅞, 1¼, 1¾, 2⅜, 3¼, 4½, 6⅛, 8⅜, 11½, 16, 22, 30″ per min. Vertical rates are ½ the foregoing. An optional feed range of ½″ to 60″ per minute can be supplied at the time the order is placed. Longitudinal, cross and vertical feed rates are then in the same proportion as standard.				
POWER RAPID TRAVERSE (Spindle running or stopped)				
Longitudinal and Cross	150″/min.	150″/min.	150″/min.	150″/min.
Vertical	75″/min.	75″/min.	75″/min.	75″/min.
DIVIDING HEAD				
Size (nominal swing)	10″	10″	12″	12″
Take-in length	28⅞″	28⅞″	36½″	44½″
OVERARM (Dynapoise)				
Underside to centerline of spindle	6⅛″	6⅛″	6⅛″	6⅛″
DRIVE				
Spindle drive motor	3 hp	5 hp	7½ or 10* hp	10 hp
Feed drive motor	1½ hp	1½ hp	3 hp	3 hp
FLOOR SPACE				
Maximum size	98¾″x81 3/16″	98¾″x83 3/16″	115 5/16″x100 5/16″	131 3/16″x100 5/16″
Area	56 sq. ft.	57 sq. ft.	80 sq. ft.	90 sq. ft.
SHIPPING DATA				
Net weight	3850 lbs.	4900 lbs.	6950 lbs.	7075 lbs.
Gross weight, domestic	4450 lbs.	5600 lbs.	7950 lbs.	8075 lbs.
Gross weight, export	4750 lbs.	5900 lbs.	8150 lbs.	8275 lbs.
Shipping case Size	72″x68″x42″	72″x70″x42″	90″x73″x50″	90″x73″x50″
Volume	119 cu. ft.	123 cu. ft.	190 cu. ft.	190 cu. ft.
CODE NAMES				
Conventional Table Feed Machines	YUWHE	YUWHF	YUWHG	YUWHH

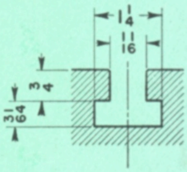
NOTE: Automatic Table Cycles not available on Universal Machines.
* 10 hp, 33 to 2000 rpm (extra cost).

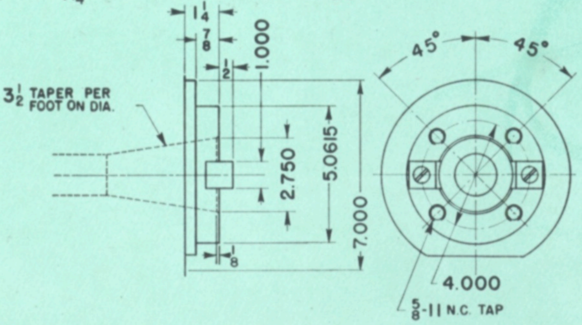




SHADED SURFACE INDICATES MAXIMUM CUTTING AREA



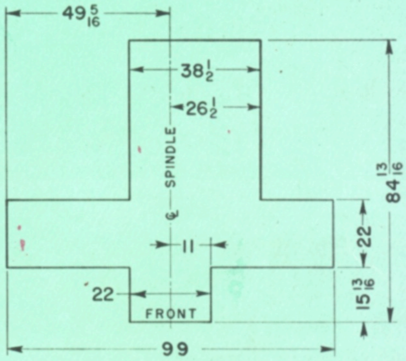




SPINDLE NOSE

STANDARD FLANGED END
WITH NO. 50 SERIES TAPER

PC-5031



FLOOR PLAN

EXPLANATION OF ML & MI SIZES

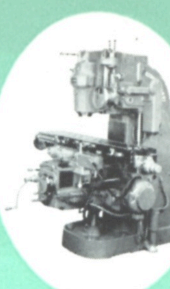
205 - 10

HORSEPOWER OF MAIN DRIVE MOTOR

SIZE OF MACHINE

TABLE WIDTH (INCHES)

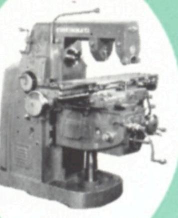
VERTICAL MACHINES



GENERAL SPECIFICATIONS

	205-10 MI
TABLE	
Working surface	54 7/16″x10″
Size over-all	54 7/16″x10″
T-slots, number and size	Three—11/16″
Distance between T-slots	2 5/16″
RANGE	
Longitudinal	28″
Cross	12″
Vertical — Knee travel	14″
Vertical — Head travel	4″
Spindle nose to top of table — Max.	19 5/16″
Spindle nose to top of table — Min.	1 5/16″
SPINDLE	
Spindle nose	No. 50 Std.
Hole for draw-in bolt	1 ⅛″
Speeds — Number	16
Speeds — Range	25-1500 rpm
25, 33, 43, 56, 76, 100, 130, 168, 225, 295, 385, 500, 680, 895, 1160, 1500 rpm.	
Low range of spindle speeds, 20 to 1200 rpm, or high range of spindle speeds, 33 to 2000 rpm, may be obtained at the time the order is placed.	
FEED	
Number of feeds	16
Range — Longitudinal and cross	¼-30″/min.
Range — Vertical	⅛-15″/min.
¼, 5/16, 7/16, ⅝, ⅞, 1¼, 1¾, 2⅜, 3¼, 4½, 6⅛, 8⅜, 11½, 16, 22, 30″ per min. Vertical rates are ½ the foregoing.	
An optional feed range of ½″ to 60″ per minute can be supplied at the time the order is placed. Longitudinal, cross, and vertical feed rates are then in the same proportion as standard.	
POWER RAPID TRAVERSE (Spindle running or stopped)	
Longitudinal and cross	150″/min.
Vertical	75″/min.
VERTICAL HEAD	
Number of feeds	16
Feed range and rates	½ longitudinal feeds
Rapid traverse	75″ per min.
DRIVE	
Spindle drive motor	5 hp
Feed drive motor	1½ hp
FLOOR SPACE	
Maximum size	99″x84 13/16″
Area	58 sq. ft.
SHIPPING DATA	
Net weight	5150 lbs.
Gross weight, domestic	5850 lbs.
Gross weight, export	6200 lbs.
Shipping case — Size	72″x80″x42″
Shipping case — Volume	140 cu. ft.
CODE NAMES	
Conventional table feed machines	YUWHI
Automatic table feed machines	YUWHN

NOTE: General Specifications for Machines with and without Automatic Table Cycle.



STANDARD EQUIPMENT

SUPPLIED WITH THE MACHINE

NOS. 203-10 ML AND 205-10 MI PLAIN

Complete Electrical Equipment for 50 or 60 cycle, 2 or 3 phase, 220 to 550 volts A. C. and wired in accordance with the "Machine Tool Electrical Standards."

Spindle Drive Motor: (3 hp for 203-10 ML, 5 hp for 205-10 MI) open, normal torque, normal starting current, N.E.M.A. frame, ball bearing.

Feed Drive Motor: 1½ hp, flange type frame.

Control: Full voltage magnetic starter with overload and undervoltage protection including transformer and push buttons operated at 110 volts.

Disconnect switch: A non-fusible type is supplied.

Two Arbor Supports:

One Outer Style "B" with 2⅛″ adjustable arbor bushing provided with lugs for brace.

One Style "A" with adjustable arbor bushing for pilot end arbors.

Automatic Backlash Eliminator.

Motor Driven Cutting Fluid Pump.

Adjustable Arbor Tightening Rod.

Wrenches . . . Overarm Brace.

Standard Feed Range, ¼″ to 30″ per min.

Rear Power Feed Control – longitudinally only.

Adjustable Table Control Dogs: Machines without Automatic Cycles: 2 feed trip. Machines with Automatic Cycles: 2 feed, 2 rapid traverse, 2 reverse, 1 end stop, 1 center safety stop.

NOS. 203-10 ML AND 205-10 MI UNIVERSAL

Complete Electrical Equipment for 50 or 60 cycle, 2 or 3 phase, 220 to 550 volt A.C. and wired in accordance with the "Machine Tool Electrical Standards."

Spindle Drive Motor: (3 hp for 203-10 ML, 5 hp for 205-10 MI) open, normal torque, normal starting current, N.E.M.A. frame, ball bearing.

Feed Drive Motor: 1½ hp, flange type frame.

Control: Full voltage magnetic starter with overload and undervoltage protection including transformer and push buttons operated at 110 volts.

Disconnect Switch: A non-fusible type is supplied.

Standard 10″ Universal Dividing Head with No. 50 standard taper hole in spindle. Equipment includes tailstock with 2-point adujstable center; steady rest; one plate for indexing through 40 to 1 reduction – all numbers up to and including 60, all even numbers and those divisible by 5 up to 120, and many beyond; provision for direct indexing from spindle nose; one plate for direct indexing; one center for headstock; one work driver; and provision for connecting head to enclosed driving mechanism segment.

Automatic Backlash Eliminator.

Enclosed Driving Mechanism Segment, including change gears for spiral milling, leads range from 2½″ to 100″ (only) for Standard Universal Dividing Heads.

Two Arbor Supports:

One Outer Style "B" with 2⅛″ adjustable arbor bushing and provided with lugs for brace.

One Style "A" with adjustable arbor bushing for pilot end arbors.

Motor Driven Cutting Fluid Pump.

Adjustable Arbor Tightening Rod.

Wrenches . . . Overarm Brace.

Standard Feed Range, ¼″ to 30″ per min.

Rear Power Feed Control – longitudinally only.

Adjustable Table Control Dogs: Two feed trip.

STANDARD EQUIPMENT

SUPPLIED WITH THE MACHINE

NO. 205-10 MI VERTICAL

Complete Electrical Equipment for 50 or 60 cycle, 2 or 3 phase, 220 to 550 volts A.C. and wired in accordance with the "Machine Tool Electrical Standards."

Spindle Drive Motor: 5 hp, open, normal torque, normal starting current, N.E.M.A. frame, ball bearing.

Feed Drive Motor: 1½ hp, flange type frame.

Control: Full voltage magnetic starter with overload and undervoltage protection including transformer and push buttons operated at 110 volts.

Disconnect Switch: A non-fusible type is supplied.

Power Feed and Power Quick Traverse to the Vertical Head.

Turret Stop, four-position with dial indicator.

Automatic Backlash Eliminator.

Motor Driven Cutting Fluid Pump.

Adjustable Arbor Tightening Rod.

Wrenches.

Standard Feed Range ¼″ to 30″ per min.

Rear Power Feed Control – longitudinally only.

Adjustable Table Control Dogs: Machines without Automatic Cycles: 2 feed trip. Machines with Automatic Cycles: 2 feed, 2 rapid traverse, 2 reverse, 1 end stop, 1 center safety stop.

NOS. 307-14 MI AND 410-14 MI PLAIN

Complete Electrical Equipment for 50 or 60 cycle, 2 or 3 phase, 220 to 550 volts A.C. and wired in accordance with the "Machine Tool Electrical Standards."

Spindle Drive Motor: (7½ hp for 307-14 MI, 10 hp for 410-14 MI) open, normal torque, normal starting current, N.E.M.A. frame, ball bearing.

Feed Drive Motor: 3 hp, flange type frame.

Control: Full voltage magnetic starter with overload and undervoltage protection including transformer and push buttons operated at 110 volts.

Disconnect Switch: A non-fusible type is supplied.

Two Arbor Supports:

One Style "B" with 2⅛″ adjustable arbor bushing *with* lugs for brace – one style "B" with 2⅛″ adjustable arbor bushing *without* lugs for brace.

Arbor Support Bushing Adapter M-01 (includes adjustable bushing, nut, washer and screw) for Style "A" arbors.

Overarm Brace.

Motor Driven Cutting Fluid Pump.

Adjustable Arbor Tightening Rod.

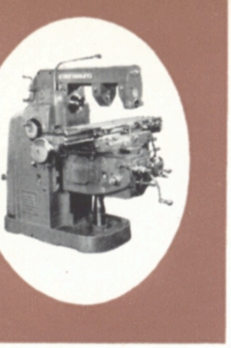
Wrenches.

Standard Feed Range ¼″ to 30″ per min.

Rear Hand Adjustments and Rear Power Feed Controls – longitudinal, cross and vertical.

Automatic Backlash Eliminator.

Adjustable Table Control Dogs: For machines without Automatic Cycles: 2 feed trip. For machines with Automatic Cycles: 2 feed, 2 rapid traverse, 2 reverse, 1 end stop, 1 center safety stop.



STANDARD EQUIPMENT

SUPPLIED WITH THE MACHINE

NOS. 307-14 MI AND 410-14 MI UNIVERSAL

Standard 12″ Universal Dividing Head with No. 50 standard taper hole in spindle. Equipment includes tailstock with 2-point adjustable center; steady rest; one plate for indexing through 40 to 1 reduction – all numbers up to and including 60, all even numbers and those divisible by 5 up to 120, and many beyond; provision for direct indexing from spindle nose; one center for headstock; one work driver; and provision for connecting head to enclosed driving mechanism segment.

Enclosed Driving Mechanism Segment, including change gears for spiral milling, leads range from 2½″ to 100″ (only) for Standard Universal Dividing Heads.

Complete Electrical Equipment for 50 or 60 cycle, 2 or 3 phase, 220 to 550 volts A.C. and wired in accordance with the "Machine Tool Electrical Standards."

Spindle Drive Motor: (7½ hp for 307-14 MI, 10 hp for 410-14 MI) open, normal torque, normal starting current, N.E.M.A. frame, ball bearing.

Feed Drive Motor: 3 hp, flange type frame.

Control: Full voltage magnetic starter with overload and undervoltage protection including transformer and push buttons operated at 110 volts.

Disconnect Switch: A non-fusible type is supplied.

Two Arbor Suports:

One Style "B" with 2⅛″ adjustable arbor bushing *with* lugs for brace – one Style "B" with 2⅛″ adjustable arbor bushing *without* lugs for brace.

Arbor Support Bushing Adapter M-01 (includes adjustable bushing, nut, washer and screw) for Style "A" arbors.

Motor Driven Cutting Fluid Pump.

Adjustable Arbor Tightening Rod.

Wrenches . . . Overarm Brace.

Standard Feed Range, ¼″ to 30″ per min.

Rear Hand Adjustments and Rear Power Feed Controls – longitudinal, cross, and vertical.

Automatic Backlash Eliminator.

Adjustable Table Control Dogs: 2 feed trip.

EQUIPMENT SUPPLIED AT EXTRA COST

NOT INCLUDED IN PRICE OF STANDARD (BASIC) MACHINE

NOS. 203-10 ML AND 205-10 MI PLAIN

1. Electrical Equipment, (with the exception of feed drive motor), to meet *"J.I.C. Standards."*
2. Electrical Equipment for D.C.
3. Electrical Equipment for 25 cycle A.C.
4. Rear Hand Adjustments and Rear Power Feed Controls, cross and vertical, supplied at factory only. Code Name – MIADJ.
5. Standard 10″ Universal Dividing Head with No. 50 standard taper hole in spindle. Equipment includes tailstock with 2-point adjustable center; steady rest; one plate for indexing through 40 to 1 reduction – all numbers up to and including 60, all even numbers and those divisible by 5 up to 120, and many beyond; provision for direct indexing from spindle nose; one center for headstock; one work driver; and provision for connecting head to enclosed driving mechanism segment.
6. Enclosed Driving Mechanism Segment, including change gears, for spiral milling, leads ranging from 2½″ to 100″ (only) for Standard Universal Dividing Head. Code Name – DREHM.
7. Wide Range Divider (applied to Standard Universal Dividing Head) for divisions from 2 to 400,000, hundreds of them exact and others compensated for the fractional remainder.
8. Arbor Support, Inner Style "B", with 2⅛″ adjustable arbor bushing and *without* lugs for brace.
9. Vises, Chucks and Chuck Adapters.
10. Arbors, Adapters, Collets, Quick Change Adapters.
11. Standard Attachments: High-Speed Universal, Heavy Vertical, Universal Spiral, Rack Milling, Slotting, Circular Milling, Cam Milling, High Number Indexing.
12. Raising Blocks, Right Angle Plates.
13. Precision Measuring Equipment.
14. Independent Overhead Spindle.
15. Automatic Table Feed Machines.
16. Automatic Spindle Stop. *Available only for Automatic Cycle machines.*
17. Extended Table Travel – 34″.

EQUIPMENT SUPPLIED AT EXTRA COST

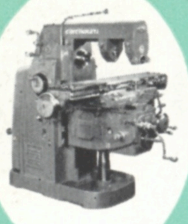
NOT INCLUDED IN PRICE OF STANDARD (BASIC) MACHINE

NOS. 203-10 ML AND 205-10 MI UNIVERSAL

1. Electrical Equipment, (with exception of feed drive motor) to meet "*J.I.C. Standards*". Includes totally enclosed spindle drive motor.
2. Electrical Equipment for D.C.
3. Electrical Equipment for 25 cycle A.C.
4. Rear Hand Adjustments and Rear Power Feed Controls, cross and vertical, supplied at factory only. Code Name – MIAND.
5. Arbor Support, Style "B". See Item No. 8, page 44.
6. Low Lead Range from ⅛″ to 100″, secured with small 1 to 20 reducing gear segment, applied to Standard Universal Dividing Head enclosed driving mechanism segment (supplied at factory only). Code Name – DREMI.
7. Long and Short Lead Attachment with a range of 0.010″ to 1000″ or optional range of 0.025″ to 3000″. Must be installed at factory. Code name – LONSH.
8. Wide Range Divider (applied to Standard Universal Dividing Head) for divisions from 2 to 400,000, hundreds of them exact and others compensated for the fractional remainder.
9. Vises, Chucks and Chuck Adapters.
10. Arbors, Adapters, Collets, Quick Change Adapters, etc.
11. Standard Attachments, High-Speed Universal, Heavy Vertical, Universal Spiral, Rack Milling, Slotting, Circular Milling, Cam Milling, High Number Indexing Attachment for Dividing Head, Spiral Milling Head, etc.
12. Raising Blocks, Right Angle Plates.
13. Precision Measuring Equipment. (Must be supplied at factory.)
14. Independent Overhead Spindle with pendant control.
15. Extended Table Travel – 34″.

NO. 205-10 MI VERTICAL

1. Electrical Equipment, (with exception of feed drive motor), to meet "*J.I.C. Standards*". Includes totally enclosed spindle drive motor.
2. Electrical Equipment for D.C.
3. Electrical Equipment for 25 cycle A.C.
4. Rear Hand Adjustments and Rear Power Feed Controls, cross and vertical, supplied at factory only. Code Name – MIREA.
5. Circular Milling Attachments, Index Bases, Vises, etc.
6. Shell End Mill Arbors, Adapters, Collets, Quick Change Adapters, etc.
7. Precision Measuring Equipment. (Must be supplied at factory.)
8. Automatic Table Feed Machines.
9. Automatic Spindle Stop. *Available only for Automatic Cycle machines.*
10. Extended Table Travel – 34″.



EQUIPMENT SUPPLIED AT EXTRA COST

NOT INCLUDED IN PRICE OF STANDARD (BASIC) MACHINE

NOS. 307-14 MI AND 410-14 MI PLAIN

1. Electrical Equipment to meet "*J.I.C. Standards*". (With exception of feed drive motor and cutting fluid pump.)
2. Electrical Equipment for D.C.
3. Electrical Equipment for 25 cycle A.C.
4. Higher Horsepower Motor, 10 hp (spindle range 33 to 2000 rpm). Must be supplied at factory.
5. Standard 12″ Universal Dividing Head with No. 50 standard taper hole in spindle. Equipment includes tailstock with 2-point adjustable center; steady rest; one plate for indexing through 40 to 1 reduction – all numbers up to and including 60, all even numbers and those divisible by 5 up to 120, and many beyond; provision for direct indexing from spindle nose; one center for headstock; one work driver and provision for connecting head to enclosed driving mechanism segment. Code Name – HYDRA.
6. Enclosed Driving Mechanism Segment, including change gears, for spiral milling, leads range from 2½″ to 100″ (only) for Standard Universal Dividing Head. Code Name – MIGAC.
7. Wide Range Divider (applied to Standard Universal Dividing Head) for divisions from 2 to 400,000, hundreds of them exact and others compensated for the fractional remainder.
8. Arbor Supports:

   Style "B" with 2⅛″ adjustable arbor bushing without lugs for brace. Code Name – MIGAD.

   Style "A" with adjustable arbor bushing for pilot end arbors. Code Name – MIGAE.
9. Vises, Chucks and Chuck Adapters.
10. Arbors, Adapters, Collets, Quick Change Adapters, etc.
11. Standard Attachments, High-Speed Universal, Heavy Vertical, Universal Spiral, Rack Milling, Slotting, Circular Milling, Cam Milling, High Number Indexing Attachment for Dividing Head, Spiral Milling Head, etc.
12. Raising Blocks, Right Angle Plates.
13. Precision Measuring Equipment. (Must be supplied at factory.)
14. Automatic Table Feed Machines.
15. Automatic Spindle Stop. *Available only for Automatic Cycle Machines.* Code Name – MISTO.
16. Independent Overhead Spindle with pendant control.

NOS. 307-14 MI AND 410-14 MI UNIVERSAL

1. Electrical Equipment to meet "*J.I.C. Standards*" (with exception of feed drive motor and cutting fluid pump motor).
2. Electrical Equipment for D.C.
3. Electrical Equipment for 25 cycle A.C.
4. Higher Horsepower Motor, 10 hp (spindle speed range 33 to 2000 rpm). Must be supplied at factory.
5. Arbor Supports:

   Style "B" with 2⅛″ adjustable arbor bushing without lugs for brace. Code Name – MIGAD.

   Style "A" with adjustable arbor bushing for pilot end arbors. Code Name – MIGAE.
6. Long and Short Lead Attachment with a range 0.010 to 1000 inches or 0.025 inches to 3000 inches. Must be installed at factory before machine is shipped. Code Name – LONSH.
7. Wide Range Divider (applied to Standard Universal Dividing Head) for divisions from 2 to 400,000, hundreds of them exact and others compensated for the fractional remainder.
8. Vises, Chucks and Chuck Adapters.
9. Arbors, Adapters, Collets, Quick Change Adapters, etc.
10. Standard Attachments, High-Speed Universal, Heavy Vertical, Universal Spiral, Rack Milling, Slotting, Circular Milling, Cam Milling, High Number Indexing Attachment for Dividing Head, Spiral Milling Head, etc.
11. Raising Blocks, Right Angle Plates.
12. Precision Measuring Equipment. (Must be supplied at factory.)
13. Independent Overhead Spindle with pendant control.

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